#1 GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	-0.574154	0.886663	3.1133369	9.69286673	12	12	12
2	4	0.00	4	1.286839	2.752314	1.2476864	1.55672127	12	12	12
3	4	0.01	4	-0.034235	1.435892	2.564108	6.57486002	12	12	12
4	4	0.01	4	0.918863	2.393637	1.6063627	2.58040103	12	12	12
5	8	0.02	8	0.600199	4.67414	3.3258596	11.0613422	8	8	12
6	8	0.03	8	-1.50576	4.794034	3.2059659	10.2782175	4	4	16
7	8	0.04	8	0.365413	8.891048	-0.891048	0.79396742	0	0	20
8	8	0.05	8	-0.847878	7.309061	0.6909388	0.4773964	-4	0	24
9	8	0.06	8	1.286839	9.45304	-1.45304	2.11132544	-4	0	24
10	8	0.06	8	-0.034235	8.141217	-0.141217	0.01994216	-4	0	24
11	8	0.07	8	0.918863	9.103555	-1.103555	1.21783373	-4	0	24
12	8	0.08	8	0.600199	8.794119	-0.794119	0.63062567	-4	0	24
13	8	0.09	8	-1.50576	6.697379	1.3026207	1.69682078	-4	0	24
14	8	0.10	8	0.365413	8.57776	-0.57776	0.33380652	-4	0	24
15	8	0.11	8	-0.847878	7.373665	0.6263348	0.39229523	-4	0	24
16	8	0.12	8	1.286839	9.517569	-1.517569	2.30301527	-4	0	24
17	8	0.13	8	-0.034235	8.20567	-0.20567	0.0423003	-4	0	24
18	8	0.14	8	0.918863	9.167934	-1.167934	1.36406901	-4	0	24
19	8	0.15	8	0.600199	8.858423	-0.858423	0.73689017	-4	0	24
20	8	0.16	8	-1.50576	6.761608	1.238392	1.53361467	-4	0	24
21	8	0.17	8	0.600556	8.877057	-0.877057	0.76922906	-4	0	24
22	8	0.18	8	-0.908781	7.376842	0.6231578	0.38832559	-4	0	24
23	8	0.18	8	0.233519	8.528253	-0.528253	0.27905109	-4	0	24
24	8	0.19	8	-1.303539	7.000297	0.9997032	0.99940648	-4	0	24
25	8	0.20	8	-0.931801	7.381124	0.6188756	0.38300699	-4	0	24
26	8	0.21	8	1.275094	9.5971	-1.5971	2.55072833	-4	0	24
27	8	0.22	8	-1.095727	7.235348	0.7646521	0.58469284	-4	0	24
28	8	0.23	8	0.074876	8.415009	-0.415009	0.17223277	-4	0	24
29	8	0.24	8	-1.405854	6.943328	1.0566724	1.11655656	-4	0	24
30	8	0.25	8	-0.817508	7.540711	0.459289	0.21094636	-4	0	24
31	8	0.26	8	0.262703	8.629949	-0.629949	0.39683569	-4	0	24
32	8	0.27	8	-0.044137	8.332126	-0.332126	0.11030738	-4	0	24
33	8	0.27	8	-1.837687	6.547582	1.4524183	2.10951886	-4	0	24
34	8	0.28	8	0.539529	8.933794	-0.933794	0.87197076	-4	0	24
35	8	0.29	8	0.363319	8.766569	-0.766569	0.58762731	-4	0	24
36	9	0.30	8	-0.644511	7.767714	0.2322864	0.05395699	-4	0	24
37	10	0.31	8	-1.113095	7.309257	0.6907427	0.47712542	-4	0	24
38	11	0.32	8	1.444965	9.878599	-1.878599	3.52913435	-4	0	24
39	12	0.34	8	-0.086133	8.359933	-0.359933	0.1295519	-4	0	24
40	13	0.35	8	-1.880241	6.579408	1.4205916	2.01808056	-4	0	24
	mean of the disturbance			-0.078194		0.2887481	mean of the standard errors			
	std dev of the disturbance			0.945018						

Σ (AO-Ot)2	17.73826		constraints	
θ	0.00		>=0	<=1
αs	0.65		>=0	<=1
β	0.15		>=0	<=1
S'	16.00		>=0	<=100 INT

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

#1 GAME MODEL WEEKS 21 TO 40

WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.250726	4	0.002864	3.900327	0.0996727	0.00993465	12	12	12
2	4	0.485735	4	-1.902763	2.229711	1.7702894	3.1339246	12	12	12
3	4	0.706014	6	-1.021432	3.331321	2.6686793	7.12184919	12	12	12
4	4	0.912486	6	0.877974	4.946194	1.0538062	1.11050753	12	12	14
5	4	1.106016	5	0.31225	4.082996	0.9170043	0.84089682	12	12	16
6	8	1.287415	8	-1.519582	2.18706	5.8129396	33.7902667	12	12	17
7	8	1.708169	8	-0.827366	3.702043	4.2979569	18.4724332	10	10	19
8	8	2.10255	10	0.698773	6.024575	3.9754252	15.8040056	8	8	21
9	8	2.47221	10	-0.558303	5.249173	4.7508268	22.5703554	5	5	26
10	8	2.8187	8	1.186491	6.849452	1.1505476	1.32375968	5	5	28
11	8	3.143471	8	-1.158429	4.829303	3.1706966	10.0533168	5	5	28
12	8	3.447885	8	0.157774	6.047909	1.9520908	3.8106586	7	7	26
13	8	3.733218	8	1.338118	7.111574	0.8884263	0.78930121	9	9	24
14	8	4.000666	5	-0.32608	5.714824	-0.714824	0.51097376	9	9	24
15	8	4.25135	5	1.256265	8.284358	-3.284358	10.7870089	9	9	21
16	8	4.48632	8	1.725953	9.725523	-1.725523	2.97742899	9	9	18
17	8	4.706563	8	0.439559	8.659372	-0.659372	0.43477115	9	9	18
18	8	4.913	9	0.054898	9.084165	-0.084165	0.00708378	6	6	21
19	8	5.106498	9	-0.628184	8.952097	0.0479029	0.00229469	3	3	25
20	8	5.287866	9	-0.421826	9.094322	-0.094322	0.00889661	3	3	26
21	8	5.457867	8	-0.770137	8.670509	-0.670509	0.44958216	3	3	27
22	8	5.617211	8	0.591006	9.989991	-1.989991	3.96006254	4	4	26
23	8	5.766568	8	0.825157	10.3735	-2.373498	5.63349126	4	4	26
24	8	5.906562	15	0.299083	10.38943	4.6105692	21.2573486	2	2	28
25	8	6.037782	8	-1.946943	6.154099	1.8459012	3.40735117	4	4	33
26	8	6.160777	8	0.23028	8.052305	-0.052305	0.00273578	6	6	31
27	8	6.276062	8	0.932408	8.869717	-0.869717	0.75640829	6	6	31
28	8	6.384121	8	0.516897	7.959047	0.0409529	0.00167714	9	9	28
29	8	6.485406	8	0.461656	8.206298	-0.206298	0.04255896	8	8	29
30	8	6.580343	8	1.189896	9.431486	-1.431486	2.04915298	6	6	31
31	8	6.669329	7	-0.908001	7.020564	-0.020564	0.0004229	8	8	29
32	8	6.752737	7	-0.673191	6.579255	0.4207449	0.17702629	13	13	23
33	8	6.830918	7	-1.151471	6.424667	0.5753434	0.33102007	13	13	22
34	8	6.904197	8	-1.219584	6.675325	1.3246747	1.75476313	13	13	21
35	8	6.972884	8	-0.951786	7.212816	0.787184	0.6196586	12	12	22
36	8	7.037265	8	0.020832	8.450821	-0.450821	0.20323959	11	11	23
37	8	7.09761	8	0.588352	9.279693	-1.279693	1.63761357	10	10	24
38	8	7.154174	7	-0.1458	8.602103	-1.602103	2.566734	10	10	24
39	8	7.207191	8	-1.750078	7.296345	0.7036548	0.49513011	10	10	23
40	8	7.256885	8	-1.787167	7.30895	0.6910501	0.47755024	10	10	23
	mean of the disturbance			-0.082514		0.7995629	mean of the standard errors			
	std dev of the disturbance			0.976239						

Σ (AO-Ot)2	45.82353		constraints		
θ	0.06		>=0	<=1	
αs	0.45		>=0	<=1	
β	0.55		>=0	<=1	
S'	26.77		>=0		INT

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

#1 GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	2.819575	4	1.094366	1.112063	2.8879366	8.34017753	12	12	12
2	4	3.651649	4	-1.486328	0	4	16	12	12	12
3	4	3.8972	6	2.084131	3.179463	2.8205473	7.95548706	12	12	12
4	6	3.969663	6	-0.273107	0.765328	5.2346716	27.4017869	12	12	14
5	6	5.400835	10	0.2088	3.342496	6.6575038	44.3223574	10	10	16
6	5	5.823183	8	-2.114716	1.846717	6.1532828	37.8628889	8	8	22
7	8	5.242926	5	-0.994706	1.860402	3.1395979	9.85707486	9	9	24
8	8	7.186371	6	1.827274	7.48394	-1.48394	2.20207646	7	7	23
9	10	7.759893	8	0.348142	6.043591	1.9564092	3.82753677	9	9	19
10	10	9.338931	10	-3.149602	4.918323	5.0816767	25.8234382	7	7	19
11	8	9.804914	12	0.892952	11.08708	0.9129174	0.83341826	2	2	24
12	8	8.532641	8	0.01184	9.339087	-1.339087	1.79315507	0	0	30
13	8	8.157186	8	-0.564832	8.386959	-0.386959	0.1497376	0	0	30
14	8	8.046386	8	-0.289689	7.887215	0.1127855	0.01272056	2	2	28
15	5	8.013689	4	-0.43304	6.382989	-2.382989	5.67863467	6	6	24
16	5	5.889358	3	1.934242	5.684481	-2.684481	7.26022859	9	9	20
17	8	5.262455	6	1.14042	3.739017	2.260983	5.112044	11	11	16
18	8	7.192134	6	1.029378	5.687003	0.3129966	0.09796685	11	11	14
19	9	7.761594	10	1.491039	7.843607	2.1563929	4.65003038	8	8	15
20	9	8.634539	12	-0.15513	8.997975	3.0020253	9.01215605	2	2	22
21	9	8.99215	10	0.728188	10.54429	-0.544293	0.29625532	-1	0	28
22	8	8.968173	8	-1.12748	8.505949	-0.505949	0.25598426	-4	0	32
23	8	8.285714	6	-1.272863	7.807457	-1.807457	3.26690014	-2	0	30
24	8	8.084316	6	-0.726485	7.747047	-1.747047	3.05217334	2	2	24
25	15	8.024882	10	0.985625	8.864985	1.1350153	1.28825972	4	4	20
26	8	12.9416	13	-2.112556	12.07637	0.9236263	0.85308554	-4	0	23
27	8	9.458296	10	-0.362761	9.954816	0.0451838	0.00204158	-5	0	29
28	8	8.430352	10	0.413312	9.444245	0.5557548	0.30886339	-7	0	33
29	8	8.127	12	-0.161973	8.565608	3.4343916	11.795046	-5	0	33
30	8	8.037478	8	0.886008	9.588742	-1.588742	2.52410151	0	0	32
31	8	8.01106	8	-0.070895	7.941332	0.0586679	0.00344193	2	2	30
32	7	8.003264	6	-0.037117	7.303226	-1.303226	1.69839764	4	4	28
33	7	7.296069	5	-1.18535	3.852251	1.1477491	1.31732796	9	9	22
34	7	7.087372	4	-0.129126	4.497083	-0.497083	0.24709133	10	10	19
35	8	7.025784	6	1.046295	5.472896	0.5271037	0.27783826	11	11	15
36	8	7.712503	6	0.972843	6.879602	-0.879602	0.77369893	9	9	15
37	8	7.915158	8	0.829907	8.064803	-0.064803	0.00419938	6	6	16
38	8	7.974963	8	-1.221259	7.401619	0.598381	0.35805977	2	2	20
39	7	7.992611	8	-0.063047	9.241568	-1.241568	1.54149217	0	0	22
40	8	7.292926	8	-2.229317	6.246264	1.7537362	3.07559067	-1	0	24
	mean of the disturbance			-0.015021		1.0924562	mean of the standard errors			
	std dev of the disturbance			1.206103						

Σ (AO-Ot)2	32.03995		constraints		
θ	0.70		>=0	<=1	
αs	0.40		>=0	<=1	
β	0.16		>=0	<=1	
S'	6.89		>=0		INT
	GRG NonLinear				

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

#1 GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

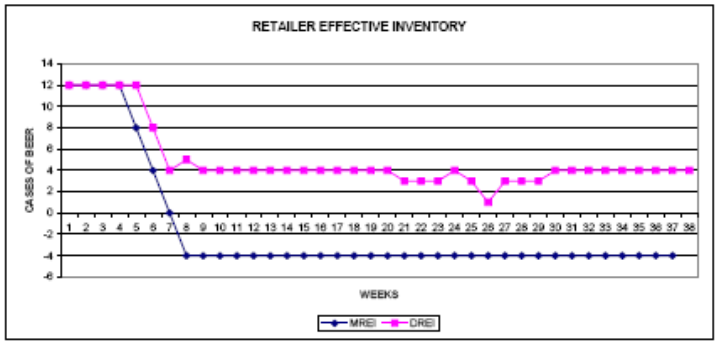
FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.607824	4	0.233048	0.190257	3.8097425	14.5141383	12	12	8
2	4	1.123285	4	-1.600785	0	4	16	12	12	8
3	4	1.560419	8	-0.221021	0.688783	7.3112172	53.4638973	12	12	8
4	6	1.931127	8	-0.358852	0.921661	7.0783391	50.1028851	12	12	12
5	6	2.549416	8	-1.659908	0.877823	7.1221765	50.7253987	10	10	16
6	10	3.073753	8	0.192131	2.615269	5.3847309	28.9953264	12	12	16
7	8	4.126237	12	0.273452	4.388004	7.6119962	57.9424868	10	10	16
8	5	4.714878	10	0.233048	4.936241	5.0637585	25.6416504	10	10	20
9	6	4.758204	6	-1.600785	2.18734	3.8126599	14.5363754	13	13	22
10	8	4.946902	6	-0.221021	1.839013	4.1609868	17.3138108	19	19	16
11	10	5.410838	0	-0.358852	1.526189	-1.526189	2.32925363	21	21	12
12	12	6.108189	4	-1.659908	2.200342	1.7996577	3.23876781	17	17	6
13	8	7.003484	8	0.192131	6.864465	1.1355351	1.28943994	11	11	4
14	8	7.15491	15	0.273452	9.65293	5.3470695	28.5911528	3	3	12
15	8	7.283327	15	0.233048	10.69934	4.3006624	18.4956968	-1	0	23
16	4	7.39223	10	-0.224432	10.35076	-0.35076	0.12303288	-1	0	30
17	3	6.87676	6	-0.158423	6.706653	-0.706653	0.4993581	10	10	25
18	6	6.287664	4	-0.941062	1.50134	2.4986601	6.24330212	22	22	16
19	6	6.243952	3	1.66637	2.787201	0.2127993	0.04528356	26	26	10
20	10	6.206882	3	1.094366	2.178127	0.8218733	0.6754758	26	26	7
21	12	6.783268	3	-1.293073	2.283863	0.7161373	0.5128527	20	20	6
22	10	7.575981	8	0.975955	8.220787	-0.220787	0.04874681	11	11	6
23	8	7.944325	10	1.33726	11.18669	-1.186689	1.40823106	4	4	11
24	6	7.952785	12	1.514665	12.65041	-0.650413	0.42303661	-1	0	18
25	6	7.656048	10	-1.008303	9.511243	0.4887565	0.23888295	1	1	22
26	10	7.404402	10	1.070535	10.06058	-0.060576	0.00366941	5	5	22
27	13	7.798818	10	-1.573242	7.172285	2.8277147	7.9959706	7	7	20
28	10	8.589168	12	-1.293073	9.201199	2.7988012	7.83328843	4	4	20
29	10	8.803553	10	0.975955	11.68461	-1.684611	2.83791506	4	4	22
30	12	8.98536	10	1.33726	12.22772	-2.227724	4.96276276	4	4	22
31	8	9.443452	12	1.514665	12.86322	-0.86322	0.74514954	4	4	20
32	8	9.224111	10	-1.008303	9.481983	0.5180173	0.26834192	6	6	22
33	6	9.0381	10	1.070535	10.73588	-0.73588	0.541519	8	8	22
34	5	8.576443	8	-1.573242	5.713657	2.2863432	5.22736542	14	14	20
35	4	8.032981	6	-1.293073	3.853041	2.1469595	4.60943501	19	19	18
36	6	7.420146	4	0.975955	3.592445	0.4075549	0.16610098	25	25	14
37	6	7.204347	2	1.33726	3.099021	-1.099021	1.20784773	27	27	10
38	8	7.021339	2	1.514665	3.093418	-1.093418	1.19556327	27	27	6
39	8	7.170052	2	-1.008303	1.997023	0.0029768	8.8611E-06	23	23	4
40	8	7.296168	2	-0.677835	4.370394	-2.370394	5.61876945	17	17	4
	mean of the disturbance			-0.110271		2.0868884	mean of the standard errors			
	std dev of the disturbance			1.08802						

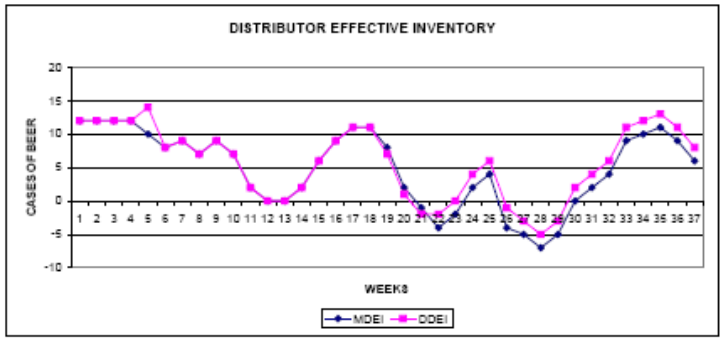
Σ (AO-Ot)2	45.84645		constraints		
θ	0.15		>=0	<=1	
αs	0.32		>=0	<=1	
β	0.00		>=0	<=1	
S'	9.96		>=0	<=100	INT
	GRG NonLinear				

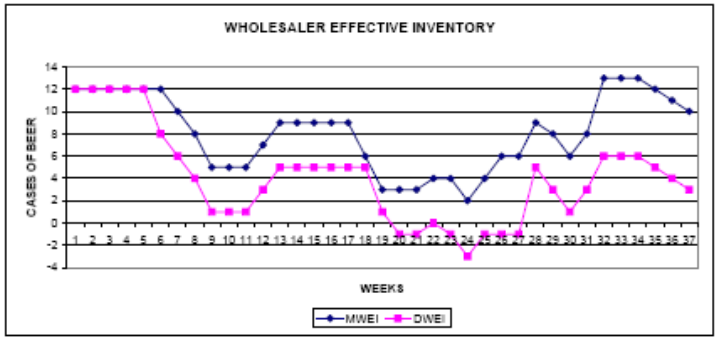
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

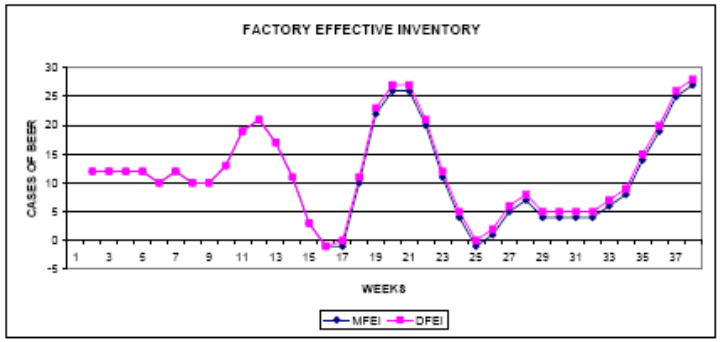
#1 GAME MODEL WEEKS 21 TO 40

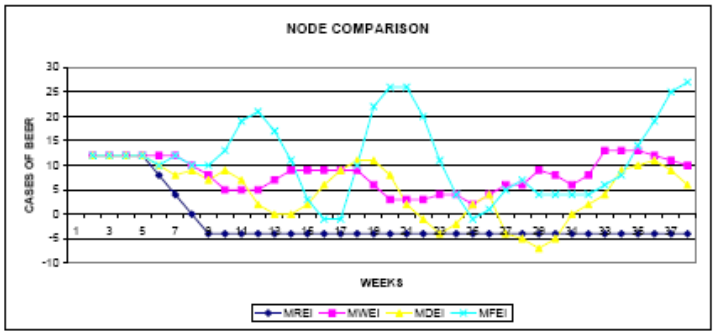
MODEL CHARTS



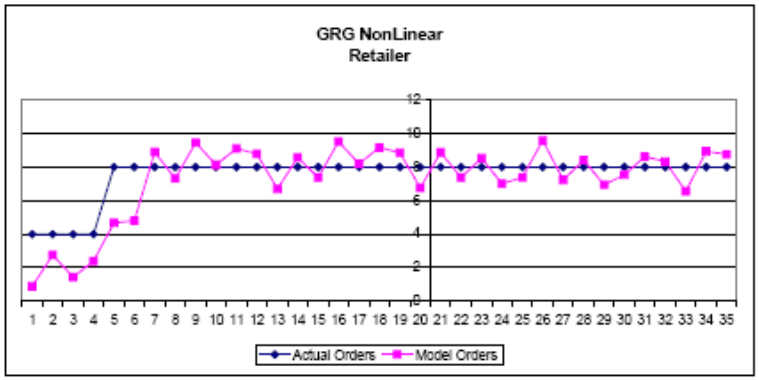


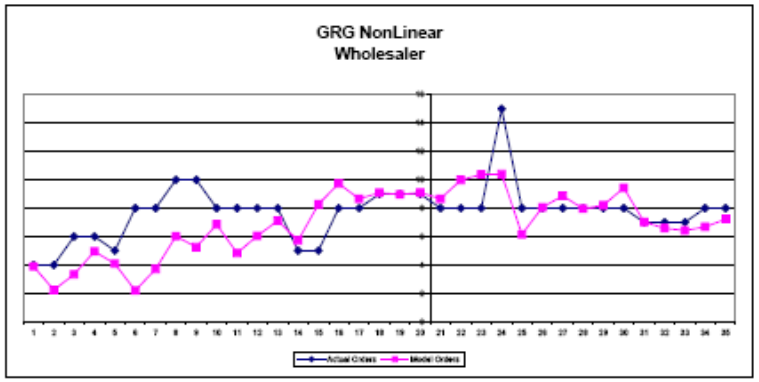


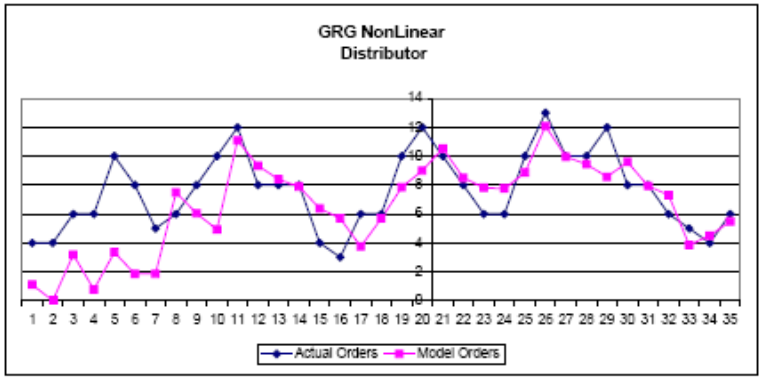


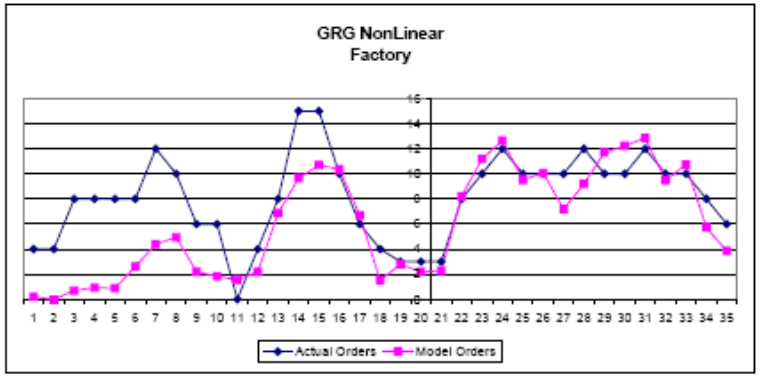


#1 GAME MODEL WEEKS 21 TO 40 ORDER CHARTS









#1 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	#1	NO IT								#1	Retailer	NO IT				
	Team Costs	$ 707.50								Costs	$ 162.00					
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	4	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	4	4	12		16	4
5	8	16	4	4	0	8	8	8	*12*	28	8	4	12		16	4
6	8	12	4	4	0	8	4	4	*8*	30	8	8	16		16	6
7	8	8	4	8	0	8	0	0	*4*	30	8	8	20		18	6
8	8	4	8	8	4	4	0	-4	*5*	34	8	8	24		16	5
9	8	8	8	8	4	8	0	-4	*4*	38	8	8	24		13	8
10	8	8	8	8	4	8	0	-4	*4*	42	8	8	24		13	8
11	8	8	8	8	4	8	0	-4	*4*	46	8	8	24		13	10
12	8	8	8	8	4	8	0	-4	*4*	50	8	8	24		15	10
13	8	8	8	8	4	8	0	-4	*4*	54	8	8	24		17	8
14	8	8	8	8	4	8	0	-4	*4*	58	8	8	24		17	8
15	8	8	8	8	4	8	0	-4	*4*	62	8	8	24		17	8
16	8	8	8	8	4	8	0	-4	*4*	66	8	8	24		17	8
17	8	8	8	8	4	8	0	-4	*4*	70	8	8	24		17	5
18	8	8	8	8	4	8	0	-4	*4*	74	8	8	24		14	5
19	8	8	8	8	4	8	0	-4	*4*	78	8	8	24		11	8
20	8	8	8	8	4	8	0	-4	*4*	82	8	8	24		11	8
21	8	8	8	8	4	8	0	-4	*3*	86	8	8	24		11	9
22	8	8	8	8	4	8	0	-4	*3*	90	8	8	24		12	8
23	8	8	8	8	4	8	0	-4	*3*	94	8	8	24		12	6
24	8	8	8	8	4	8	0	-4	*4*	98	8	8	24		10	10
25	8	8	8	8	4	8	0	-4	*3*	102	8	8	24		12	10
26	8	8	8	8	4	8	0	-4	*1*	106	8	8	24		14	8
27	8	8	8	8	4	8	0	-4	*3*	110	8	8	24		14	11
28	8	8	8	8	4	8	0	-4	*3*	114	8	8	24		17	7
29	8	8	8	8	4	8	0	-4	*3*	118	8	8	24		16	6
30	8	8	8	8	4	8	0	-4	*4*	122	8	8	24		14	10
31	8	8	8	8	4	8	0	-4	*4*	126	8	8	24		16	13
32	8	8	8	8	4	8	0	-4	*4*	130	8	8	24		21	8
33	8	8	8	8	4	8	0	-4	*4*	134	8	8	24		21	8
34	8	8	8	8	4	8	0	-4	*4*	138	8	8	24		21	7
35	8	8	8	8	4	8	0	-4	*4*	142	8	8	24		20	7
36	8	8	8	8	4	8	0	-4	*4*	146	8	8	24		19	7
37	8	8	8	8	4	8	0	-4	*4*	150	8	8	24		18	8
38	8	8	8	8	4	8	0	-4	*4*	154	8	8	24		18	8
39	8	8	8	8	4	8	0	-4	*4*	158	8	8	24		18	8
40	8	8	8	8	4	8	0	-4	*4*	162	8	8	24		18	8

#1 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

#1 Wholesaler NO IT #1
Costs $ 165.50 Costs

WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL	DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4		12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12	16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12	16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	6	4	12	16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	6	6	14	16	4	4	0	12	12	*12*
5	6	0	12	12	*12*	30	5	6	16	16	4	6	0	10	10	*14*
6	6	0	12	12	*8*	36	8	5	17	14	6	6	0	8	8	*8*
7	5	0	10	10	*6*	41	8	8	19	14	6	10	0	9	9	*9*
8	8	0	8	8	*4*	45	10	8	21	15	10	8	0	7	7	*7*
9	8	0	5	5	*1*	47.5	10	10	26	17	8	5	0	9	9	*9*
10	10	0	5	5	*1*	50	8	10	28	17	5	6	0	7	7	*7*
11	10	0	5	5	*1*	52.5	8	8	28	12	6	8	0	2	2	*2*
12	8	0	7	7	*3*	56	8	8	26	8	8	10	0	0	0	*0*
13	8	0	9	9	*5*	60.5	8	8	24	8	10	12	0	0	0	*0*
14	8	0	9	9	*5*	65	5	8	24	10	12	8	0	2	2	*2*
15	8	0	9	9	*5*	69.5	5	5	21	14	8	7	0	6	6	*6*
16	5	0	9	9	*5*	74	8	5	18	14	7	8	0	9	9	*9*
17	5	0	9	9	*5*	78.5	8	8	18	16	8	5	0	11	11	*11*
18	8	0	6	6	*5*	81.5	9	8	21	19	5	3	0	11	11	*11*
19	8	0	3	3	*1*	83	9	9	25	16	3	6	0	8	8	*7*
20	9	0	3	3	*-1*	84.5	9	9	26	11	6	6	0	2	2	*1*
21	8	0	3	3	*-1*	86	8	9	27	8	6	10	1	0	-1	*-2*
22	6	0	4	4	*0*	88	8	8	26	6	10	12	4	0	-4	*-2*
23	10	0	4	4	*-1*	90	8	8	26	10	12	10	2	0	-2	*0*
24	10	0	2	2	*-3*	91	15	8	28	12	10	7	0	2	2	*4*
25	8	0	4	4	*-1*	93	8	15	33	12	7	7	0	4	4	*6*
26	11	0	6	6	*-1*	96	8	8	31	11	7	6	4	0	-4	*-1*
27	7	0	6	6	*-1*	99	8	8	31	7	6	10	5	0	-5	*-3*
28	6	0	9	9	*5*	103.5	8	8	28	6	10	13	7	0	-7	*-5*
29	10	0	8	8	*3*	107.5	8	8	29	10	13	10	5	0	-5	*-3*
30	13	0	6	6	*1*	110.5	8	8	31	13	10	10	0	0	0	*2*
31	8	0	8	8	*3*	114.5	7	8	29	10	10	12	0	2	2	*4*
32	8	0	13	13	*6*	121	7	7	23	12	12	8	0	4	4	*6*
33	7	0	13	13	*6*	127.5	7	7	22	16	8	8	0	9	9	*11*
34	7	0	13	13	*6*	134	8	7	21	17	8	6	0	10	10	*12*
35	7	0	12	12	*5*	140	8	8	22	18	6	5	0	11	11	*13*
36	8	0	11	11	*4*	145.5	8	8	23	17	5	4	0	9	9	*11*
37	8	0	10	10	*3*	150.5	8	8	24	14	4	6	0	6	6	*8*
38	8	0	10	10	*3*	155.5	7	8	24	10	6	6	0	2	2	*4*
39	8	0	10	10	*3*	160.5	8	7	23	8	6	8	0	0	0	*2*
40	6	0	10	10	*3*	165.5	8	8	23	6	8	8	1	0	-1	*1*

#1 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		NO IT									#1 Factory		NO IT	
	$ 133.00											Costs $ 247.00			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL
0	0	4	4	12		12	4	4	0	12			0	4	8
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8
3	18	6	4	12		16	4	4	0	12	12	*12*	18	8	8
4	24	6	6	14		16	4	8	0	12	12	*12*	24	8	12
5	29	10	6	16		16	8	8	0	10	10	*10*	29	8	16
6	33	8	10	22		18	8	8	0	12	12	*12*	35	8	16
7	37.5	5	8	24		20	8	8	0	10	10	*10*	40	12	16
8	41	6	5	23		18	8	12	0	10	10	*10*	45	10	20
9	45.5	8	6	19		18	12	10	0	13	13	*13*	51.5	6	22
10	49	10	8	19		25	10	6	0	19	19	*19*	61	6	16
11	50	12	10	24		29	6	6	0	21	21	*21*	71.5	0	12
12	50	8	12	30		27	6	0	0	17	17	*17*	80	4	6
13	50	8	8	30		23	0	4	0	11	11	*11*	85.5	8	4
14	51	8	8	28		11	4	8	0	3	3	*3*	87	15	12
15	54	4	8	24		7	8	15	1	0	-1	*-1*	88	15	23
16	58.5	3	4	20		8	15	15	1	0	-1	*0*	89	10	30
17	64	6	3	16		15	15	10	0	10	10	*11*	94	6	25
18	69.5	6	6	14		25	10	6	0	22	22	*23*	105	4	16
19	73.5	10	6	15		32	6	4	0	26	26	*27*	118	3	10
20	74.5	12	10	22		32	4	3	0	26	26	*27*	131	3	7
21	75.5	10	12	28		30	3	3	0	20	20	*21*	141	3	6
22	79.5	8	10	32		23	3	3	0	11	11	*12*	146.5	8	6
23	81.5	6	8	30		14	3	8	0	4	4	*5*	148.5	10	11
24	82.5	6	6	24		7	8	10	1	0	-1	*0*	149.5	12	18
25	84.5	10	6	20		8	10	12	0	1	1	*2*	150	10	22
26	88.5	13	10	23		11	12	10	0	5	5	*6*	152.5	10	22
27	93.5	10	13	29		17	10	10	0	7	7	*8*	156	10	20
28	100.5	10	10	33		17	10	10	0	4	4	*5*	158	12	20
29	105.5	12	10	33		14	10	12	0	4	4	*5*	160	10	22
30	105.5	8	12	32		14	12	10	0	4	4	*5*	162	10	22
31	106.5	8	8	30		16	10	10	0	4	4	*5*	164	12	20
32	108.5	6	8	28		14	10	12	0	6	6	*7*	167	10	22
33	113	5	6	22		16	12	10	0	8	8	*9*	171	10	22
34	118	4	5	19		20	10	10	0	14	14	*15*	178	8	20
35	123.5	6	4	15		24	10	8	0	19	19	*20*	187.5	6	18
36	128	6	6	15		29	8	6	0	25	25	*26*	200	4	14
37	131	8	6	16		33	6	4	0	27	27	*28*	213.5	2	10
38	132	8	8	20		33	4	2	0	27	27	*28*	227	2	6
39	132	8	8	22		31	2	2	0	23	23	*24*	238.5	2	4
40	133	8	8	24		25	2	2	0	17	17	*18*	247	2	4

#1 GAME MODEL WEEKS 21 TO 40 MODEL DATA

#1 NO IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	4	12	6	12	6	12	8	12
4	4	12	6	12	6	12	8	12
5	8	12	5	12	10	14	8	10
6	8	8	8	8	8	8	8	12
7	8	4	8	6	5	9	12	10
8	8	5	10	4	6	7	10	10
9	8	4	10	1	8	9	6	13
10	8	4	8	1	10	7	6	19
11	8	4	8	1	12	2	0	21
12	8	4	8	3	8	0	4	17
13	8	4	8	5	8	0	8	11
14	8	4	5	5	8	2	15	3
15	8	4	5	5	4	6	15	-1
16	8	4	8	5	3	9	10	0
17	8	4	8	5	6	11	6	11
18	8	4	9	5	6	11	4	23
19	8	4	9	1	10	7	3	27
20	8	4	9	-1	12	1	3	27
21	8	3	8	-1	10	-2	3	21
22	8	3	8	0	8	-2	8	12
23	8	3	8	-1	6	0	10	5
24	8	4	15	-3	6	4	12	0
25	8	3	8	-1	10	6	10	2
26	8	1	8	-1	13	-1	10	6
27	8	3	8	-1	10	-3	10	8
28	8	3	8	5	10	-5	12	5
29	8	3	8	3	12	-3	10	5
30	8	4	8	1	8	2	10	5
31	8	4	7	3	8	4	12	5
32	8	4	7	6	6	6	10	7
33	8	4	7	6	5	11	10	9
34	8	4	8	6	4	12	8	15
35	8	4	8	5	6	13	6	20
36	8	4	8	4	6	11	4	26
37	8	4	8	3	8	8	2	28
38	8	4	7	3	8	4	2	28
39	8	4	8	3	8	2	2	24
40	8	4	8	3	8	1	2	18

A & W GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.248771	0.248771	3.7512293	14.0717216	12	12	12
2	4	4.00	4	-0.197362	3.802638	0.1973618	0.03895166	12	12	12
3	4	4.00	8	0.275816	4.275816	3.7241837	13.8695443	12	12	12
4	4	4.00	6	-1.327241	2.672759	3.3272408	11.0705311	12	12	16
5	8	4.00	1000	1.702153	5.702153	994.29785	988628.208	8	8	18
6	8	8.00	0	0.847833	8.847833	-8.847833	78.28415	4	4	1014
7	8	8.00	0	-0.989288	7.010712	-7.010712	49.1500838	4	4	1006
8	8	8.00	10	-0.580138	7.419862	2.5801377	6.65711062	2	2	1000
9	8	8.00	0	1.557796	9.557796	-9.557796	91.3514578	4	4	1000
10	8	8.00	0	0.174554	8.174554	-8.174554	66.8233254	1	1	995
11	8	8.00	0	1.767207	9.767207	-9.767207	95.3983249	-1	0	989
12	8	8.00	0	-0.688338	7.311662	-7.311662	53.4603975	0	0	980
13	8	8.00	0	0.721963	8.721963	-8.721963	76.0726425	12	12	960
14	8	8.00	0	-0.564101	7.435899	-7.435899	55.2926007	6	6	958
15	8	8.00	0	-0.45628	7.54372	-7.54372	56.9077145	48	48	908
16	8	8.00	0	1.968977	9.968977	-9.968977	99.3805115	60	60	888
17	8	8.00	1000	2.071235	10.07124	989.92876	979958.96	57	57	983
18	8	8.00	0	0.140705	8.140705	-8.140705	66.2710699	59	59	1873
19	8	8.00	0	-0.688338	7.311662	-7.311662	53.4603975	924	924	1000
20	8	8.00	0	0.721963	8.721963	-8.721963	76.0726425	916	916	1000
21	8	8.00	0	-0.074165	7.925835	-7.925835	62.8188597	1908	1908	0
22	8	8.00	0	-0.651012	7.348988	-7.348988	54.0076232	1900	1900	0
23	8	8.00	0	-0.528706	7.471294	-7.471294	55.820231	1892	1892	0
24	8	8.00	0	0.430918	8.430918	-8.430918	71.0803783	1884	1884	0
25	8	8.00	0	-0.306358	7.693642	-7.693642	59.1921305	1876	1876	0
26	8	8.00	0	1.580215	9.580215	-9.580215	91.7806256	1868	1868	0
27	8	8.00	200	-0.326605	7.673395	192.3266	36999.5229	1860	1860	0
28	8	8.00	200	-0.074165	7.925835	192.07417	36892.4849	1852	1852	200
29	8	8.00	200	-0.651012	7.348988	192.65101	37114.4125	1844	1844	400
30	8	8.00	200	-0.528706	7.471294	192.52871	37067.3027	1836	1836	600
31	8	8.00	200	0.430918	8.430918	191.56908	36698.7132	2028	2028	600
32	8	8.00	200	-0.306358	7.693642	192.30636	36981.7352	2220	2220	600
33	8	8.00	200	1.580215	9.580215	190.41978	36259.6944	2412	2412	600
34	8	8.00	200	-0.326605	7.673395	192.3266	36999.5229	2604	2604	600
35	8	8.00	200	-0.074165	7.925835	192.07417	36892.4849	2796	2796	600
36	9	8.00	838	-0.651012	7.348988	830.65101	689981.104	2988	2988	600
37	10	9.00	1862	-0.528706	8.471294	1853.5287	3435568.66	3180	3180	1238
38	11	10.00	0	-1.296943	8.703057	-8.703057	75.7432096	3372	3372	2900
39	12	11.00	100	-1.807554	9.192446	90.807554	8246.01195	3564	3564	2700
40	13	12.00	200	1.187659	13.18766	186.81234	34898.8509	4394	4394	1962
	mean of the disturbance			0.196637		101.97479	mean of the standard errors			
	std dev of the disturbance			0.923385						

			constraints		
Σ (AO-Ot)2	4501051				
θ	1.00		>=0	<=1	
αs	0.00		>=0	<=1	
β	0.00		>=0	<=1	
S'	0.00		>=0	<=100	INT

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

A & W GAME MODEL WEEKS 21 TO 40

WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.52602	4	1.337638	1.863658	2.1363417	4.56395588	12	12	12
2	4	0.982865	4	0.910102	1.892967	2.1070325	4.43958597	12	12	12
3	4	1.379634	4	-2.4511	0	4	16	12	12	12
4	8	1.724225	5	2.535586	4.25981	0.7401897	0.54788073	12	12	12
5	6	2.54952	6	-0.402737	2.146784	3.8532163	14.8472758	8	8	13
6	1000	3.003275	50	-1.219415	1.783861	48.216139	2324.79609	6	6	15
7	0	134.1133	1200	1.725875	135.8392	1064.1608	1132438.29	-990	0	61
8	0	116.4767	1500	1.337638	117.8144	1382.1856	1910437.14	-985	0	1256
9	10	101.1595	0	0.910102	102.0696	-102.0696	10418.1949	-979	0	2750
10	0	89.17154	0	-2.4511	86.72044	-86.72044	7520.43411	-980	0	2741
11	0	77.44504	0	2.535586	79.98062	-79.98062	6396.90014	-960	0	2721
12	0	67.26063	0	-0.402737	66.8579	-66.8579	4469.97814	-958	0	2719
13	0	58.41553	0	-1.219415	57.19611	-57.19611	3271.39505	-908	0	2669
14	0	50.73359	0	1.725875	52.45947	-52.45947	2751.99591	-888	0	2649
15	0	44.06188	0	1.337638	45.39951	-45.39951	2061.11584	-883	0	2644
16	0	38.26752	0	0.910102	39.17762	-39.17762	1534.88609	-873	0	2634
17	0	33.23515	300	-2.4511	30.78405	269.21595	72477.227	127	127	1634
18	1000	28.86456	300	2.535586	31.40015	268.59985	72145.8793	1761	1761	300
19	0	156.5737	0	-0.402737	156.171	-156.171	24389.3656	761	761	600
20	0	135.9835	0	-1.219415	134.7641	-134.7641	18161.3508	761	761	600
21	0	118.101	200	-1.608585	116.4924	83.507614	6973.52164	1061	1061	300
22	0	102.5701	200	-0.114445	102.4557	97.544338	9514.8978	1361	1361	200
23	0	89.08163	200	-0.517065	88.56457	111.43543	12417.8561	1361	1361	400
24	0	77.36695	500	0.583515	77.95047	422.04953	178125.906	1361	1361	600
25	0	67.19282	200	-0.430891	66.76193	133.23807	17752.3846	1561	1561	900
26	0	58.35663	200	-0.529493	57.82714	142.17286	20213.1234	1761	1761	900
27	0	50.68244	200	1.122579	51.80502	148.19498	21961.7516	1961	1961	900
28	200	44.01745	200	-1.608585	42.40887	157.59113	24834.9658	2461	2461	600
29	200	64.52993	400	-0.114445	64.41548	335.58452	112616.968	2461	2461	600
30	200	82.34491	200	-0.978544	81.36637	118.63363	14073.9381	2461	2461	800
31	200	97.81714	1000	0.388969	98.18611	901.81389	813268.292	2461	2461	800
32	200	111.2547	1000	-0.186262	111.0684	888.93157	790199.334	2461	2461	1600
33	200	122.9251	1000	-1.072272	121.8529	878.14713	771142.384	2661	2661	2200
34	200	133.0609	1000	-1.934428	131.1264	868.87356	754941.265	2661	2661	3000
35	200	141.8637	1000	-0.132349	141.7313	858.26865	736625.084	3461	3461	3000
36	200	149.5089	200	-1.152898	148.356	51.643991	2667.10181	4261	4261	3000
37	838	156.1487	400	0.048527	156.1973	243.80274	59439.7749	5061	5061	2200
38	1862	245.8156	200	-1.779131	244.0364	-44.03642	1939.20672	5223	5223	1600
39	0	458.3518	100	-0.208473	458.1433	-358.1433	128266.656	4361	4361	800
40	100	398.0763	100	-0.709143	397.3671	-297.3671	88427.216	4561	4561	700
	mean of the disturbance			-0.044867		239.15445	mean of the standard errors			
	std dev of the disturbance			1.43046						

Σ (AO-Ot)2	4585402		constraints		
θ	0.13		>=0	<=1	
αs	0.00		>=0	<=1	
β	0.45		>=0	<=1	
S'	3.65		>=0	<=100	INT

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

A & W GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	3.910513	4	1.493314	7.880419	-3.880419	13.5454856	12	12	12
2	4	3.997998	4	1.595626	7.870216	-3.870216	14.9785738	12	12	12
3	4	3.999955	2	-0.587688	5.68886	-3.68886	13.6076864	12	12	12
4	4	3.999999	2	0.492372	6.828874	-4.828874	23.3180208	12	12	10
5	5	4	20	-1.086425	5.309987	14.690013	215.796471	12	12	8
6	6	4.977628	2	0.480621	7.405335	-5.405335	29.217644	11	11	24
7	50	5.977128	50	-0.752047	7.291987	42.708013	1823.97441	7	7	24
8	1200	49.01513	1000	1.493314	51.34719	948.65281	899942.153	-41	0	72
9	1500	1174.25	1000	1.595626	1147.329	-147.3288	21705.7706	-1221	0	1052
10	0	1492.712	2000	-0.587688	1433.712	566.28783	320681.907	-2719	0	2050
11	0	33.39457	1000	0.492372	0	1000	1000000	-2669	0	4000
12	0	0.747095	1000	-1.086425	0	1000	1000000	-2649	0	4980
13	0	0.016714	1000	0.480621	0	1000	1000000	-2644	0	5975
14	0	0.000374	1000	0.012346	0	1000	1000000	-2634	0	6965
15	0	8.37E-06	1000	-0.983627	0	1000	1000000	-1634	0	6965
16	0	1.87E-07	0	-0.367847	0	0	0	1366	1366	4965
17	0	4.19E-09	0	1.963854	0	0	0	4331	4331	2000
18	300	9.37E-11	0	-0.647499	0	0	0	5331	5331	1000
19	300	293.2885	0	-0.08452	115.5399	-115.5399	13349.4709	6031	6031	0
20	0	299.8499	0	0.257529	131.4299	-131.4299	17273.8133	5731	5731	0
21	0	6.708162	0	-0.339804	0	0	0	5731	5731	0
22	200	0.150073	0	-0.554937	0	0	0	5731	5731	0
23	200	195.529	0	0.286968	33.12951	-33.12951	1097.56437	5531	5531	0
24	200	199.9	0	-0.718923	42.48562	-42.48562	1805.02759	5331	5331	0
25	500	199.9978	0	-0.529493	48.76386	-48.76386	2377.91444	5131	5131	0
26	200	493.2884	0	1.122579	358.6842	-358.6842	128654.342	4631	4631	0
27	200	206.5614	0	-1.608585	75.21699	-75.21699	5657.59595	4431	4431	0
28	200	200.1468	0	-0.114445	76.28758	-76.28758	5819.79509	4231	4231	0
29	200	200.0033	0	-0.517065	81.73249	-81.73249	6680.19967	4031	4031	0
30	400	200.0001	0	0.583515	88.82089	-88.82089	7889.15044	3831	3831	0
31	200	395.5257	0	-0.430891	295.3141	-295.3141	87210.4341	3431	3431	0
32	1000	204.3742	3000	-0.529493	110.0552	2889.9448	8351781.22	3231	3231	0
33	1000	982.2006	1600	1.122579	829.6231	770.37687	593480.526	2231	2231	3000
34	1000	999.6018	0	-1.608585	826.3202	-826.3202	682805.059	1231	1231	4600
35	1000	999.9911	1000	-0.114445	858.1588	141.84121	20118.9294	231	231	4600
36	1000	999.9998	0	-0.517065	857.7649	-857.7649	735760.586	2231	2231	2600
37	200	1000	762	0.583515	888.8208	-126.8208	16083.5183	2791	2791	1040
38	400	217.8974	0	-0.430891	88.869	-88.869	7897.69915	2591	2591	1802
39	200	395.926	500	-0.529493	278.7811	221.21888	48937.7924	2191	2191	1802
40	100	204.3832	0	1.122579	79.9038	-79.9038	6384.6177	2091	2091	2202
	mean of the disturbance			0.006366		229.48497	mean of the standard errors			
	std dev of the disturbance			0.934083						

Σ (AO-Ot)2	10710442		constraints		
θ	0.98		>=0	<=1	
αs	0.03		>=0	<=1	
β	1.00		>=0	<=1	
S'	100.00		>=0	<=100	INT

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

A & W GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.057408	4	1.187659	0	4	16	12	12	8
2	4	0.113993	4	0.040271	0	4	16	12	12	8
3	4	0.169765	10	-1.859678	0	10	100	12	12	8
4	2	0.224737	50	0.947985	0	50	2500	12	12	14
5	2	0.250216	8	0.733479	0	8	64	14	14	60
6	20	0.275329	2	-0.596215	0	2	4	22	22	58
7	2	0.55842	10	2.744288	0	10	100	52	52	10
8	50	0.579109	5	0.010614	0	5	25	58	58	12
9	1000	1.288403	10	-0.149776	0	10	100	10	10	15
10	1000	15.62202	1000	-0.540653	10.04347	989.95653	980013.937	-980	0	15
11	2000	29.74992	3000	-0.447172	0	3000	9000000	-1975	0	1010
12	1000	58.02716	8000	-1.527906	0	8000	64000000	-3965	0	4000
13	1000	71.54646	1000	2.159082	0	1000	1000000	-3965	0	11000
14	1000	84.87172	500	-0.186661	0	500	250000	-1965	0	9000
15	1000	98.00574	10	-0.517262	0	10	100	5035	5035	1500
16	1000	110.9513	5	0.290518	0	5	25	5035	5035	510
17	0	123.711	10	1.005844	0	10	100	4535	4535	15
18	0	121.9356	0	-0.677357	0	0	0	4545	4545	15
19	0	120.1854	0	-0.091727	0	0	0	4550	4550	10
20	0	118.4605	0	-1.531579	0	0	0	4560	4560	0
21	0	116.7604	0	0.164821	0	0	0	4560	4560	0
22	0	115.0846	0	1.205541	0	0	0	4560	4560	0
23	0	113.4329	0	-0.104997	0	0	0	4560	4560	0
24	0	111.8049	0	0.403466	0	0	0	4560	4560	0
25	0	110.2003	0	-0.252723	0	0	0	4560	4560	0
26	0	108.6187	0	1.525845	0	0	0	4560	4560	0
27	0	107.0598	0	0.700477	0	0	0	4560	4560	0
28	0	105.5232	0	0.059281	0	0	0	4560	4560	0
29	0	104.0087	0	-0.449018	0	0	0	4560	4560	0
30	0	102.516	0	1.461568	0	0	0	4560	4560	0
31	0	101.0447	0	-0.948964	0	0	0	4560	4560	0
32	0	99.59447	0	-0.695002	0	0	0	4560	4560	0
33	3000	98.16508	0	-1.337618	0	0	0	4560	4560	0
34	1600	139.8125	0	-1.068533	0	0	0	1560	1560	0
35	0	160.7693	100	2.01704	162.7863	-62.78633	3942.12352	-40	0	0
36	1000	158.4619	100	0.51624	125.3922	-25.39216	644.761799	-40	0	100
37	0	170.5398	100	0.464676	103.8324	-3.832447	14.6876489	-1040	0	200
38	762	168.0922	0	0.734627	101.6548	-101.6548	10333.6969	-940	0	200
39	0	176.616	300	-0.134417	142.8956	157.10443	24681.8011	-1602	0	100
40	500	174.0812	100	0.256074	73.57926	26.420737	698.056347	-1502	0	300
	mean of the disturbance			0.104998		387.29058	mean of the standard errors			
	std dev of the disturbance			1.095334						

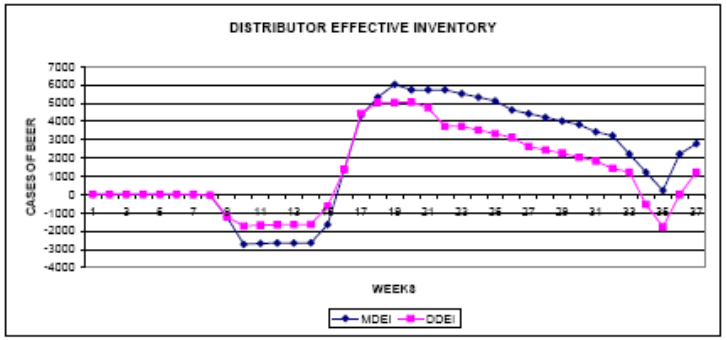
Σ (AO-Ot)2	40315.13		constraints		
θ	0.01		>=0	<=1	
αs	0.34		>=0	<=1	
β	1.00		>=0	<=1	
S'	0.00		>=0	<=100	INT

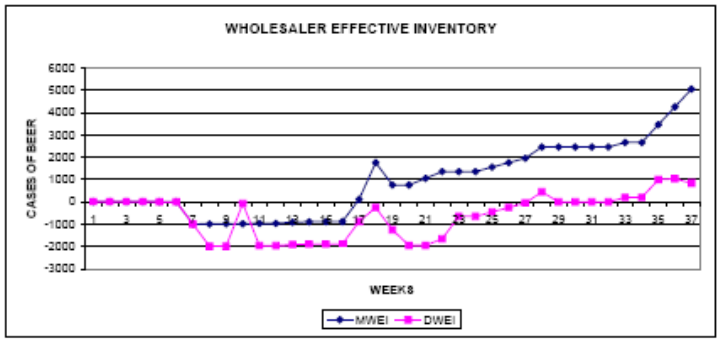
GRG NonLinear

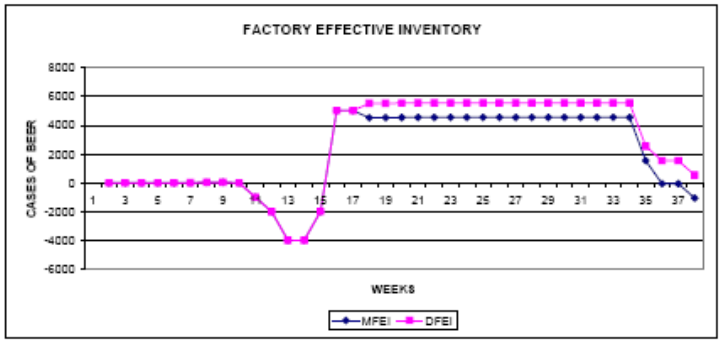
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO+\alpha s(s'-S_t-\beta SL_t)+\varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

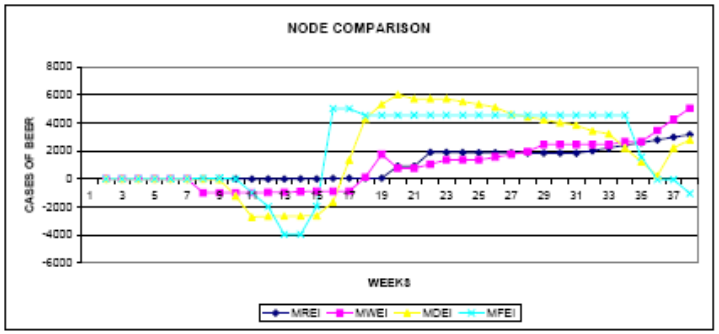
A & W GAME MODEL WEEKS 21 TO 40

MODEL CHARTS

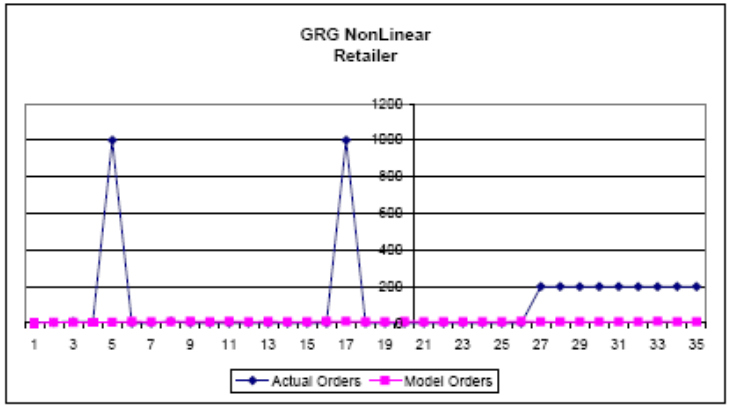


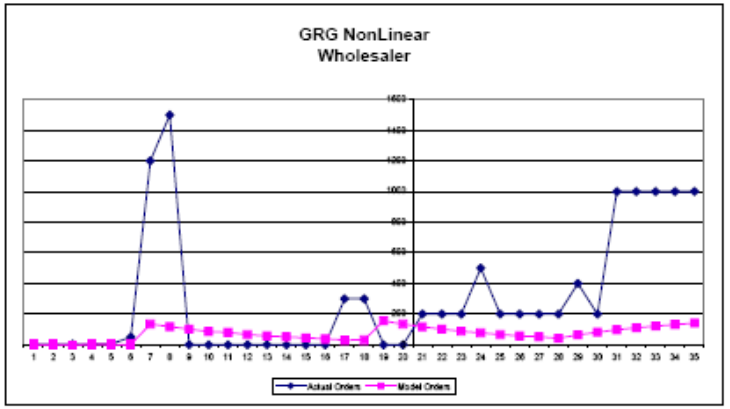


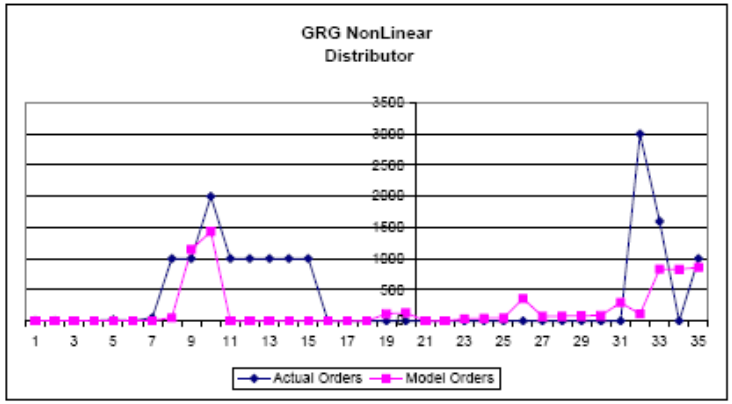


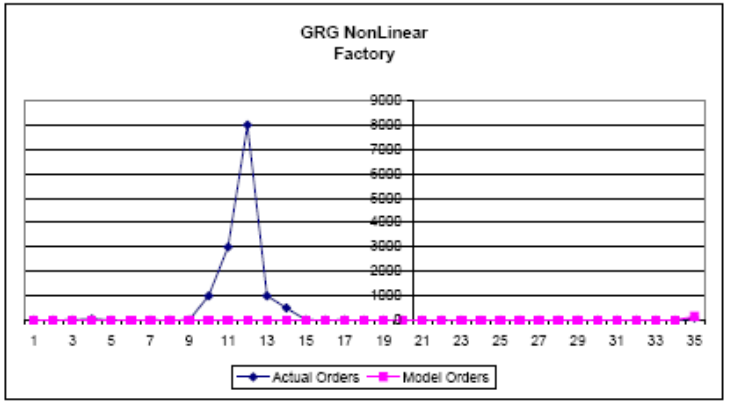


A & W GAME MODEL WEEKS 21 TO 40 ORDER CHARTS









A & W GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	A&W ROOTBEER	NO IT						A&W ROOTBEER		Retailer	NO IT					
	Team Costs	$ 189,588.50							Costs	$ 25,216.50						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	8	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	6	8	16		16	4
5	8	16	4	8	0	8	8	8	*8*	28	1000	6	18		16	4
6	8	12	8	6	0	8	4	4	*4*	30	0	1000	1014		12	4
7	8	12	6	10	0	8	4	4	*4*	32	0	0	1006		10	5
8	8	10	10	5	0	8	2	2	*2*	33	10	0	1000		5	6
9	8	12	5	6	0	8	4	4	*4*	35	0	10	1000		6	9
10	8	9	6	9	0	8	1	1	*1*	35.5	0	0	995		9	20
11	8	7	9	20	1	7	0	-1	*-1*	36.5	0	0	989		20	2
12	8	9	20	2	0	9	0	0	*0*	36.5	0	0	980		2	50
13	8	20	2	50	0	8	12	12	*12*	42.5	0	0	960		50	20
14	8	14	50	20	0	8	6	6	*6*	45.5	0	0	958		20	5
15	8	56	20	5	0	8	48	48	*48*	69.5	0	0	908		5	10
16	8	68	5	10	0	8	60	60	*65*	99.5	0	0	888		10	1000
17	8	65	10	873	0	8	57	57	*67*	128	1000	0	883		1000	1634
18	8	67	873	0	0	8	59	59	*1059*	157.5	0	1000	1873		1761	0
19	8	932	0	1000	0	8	924	924	*1686*	619.5	0	0	1000		1761	0
20	8	924	1000	0	0	8	916	916	*1678*	1077.5	0	0	1000		761	300
21	8	1916	0	0	0	8	1908	1908	*1670*	2031.5	0	0	0		1061	300
22	8	1908	0	0	0	8	1900	1900	*1967*	2981.5	0	0	0		1361	0
23	8	1900	0	0	0	8	1892	1892	*2167*	3927.5	0	0	0		1361	0
24	8	1892	0	0	0	8	1884	1884	*3159*	4869.5	0	0	0		1361	200
25	8	1884	0	0	0	8	1876	1876	*3151*	5807.5	0	0	0		1561	200
26	8	1876	0	0	0	8	1868	1868	*3349*	6741.5	0	0	0		1761	200
27	8	1868	0	0	0	8	1860	1860	*3591*	7671.5	200	0	0		1961	500
28	8	1860	0	0	0	8	1852	1852	*3733*	8597.5	200	200	200		2461	200
29	8	1852	0	200	0	8	1844	1844	*3736*	9519.5	200	200	400		2661	200
30	8	1844	200	200	0	8	1836	1836	*4382*	10437.5	200	200	600		2661	200
31	8	2036	200	200	0	8	2028	2028	*4578*	11451.5	200	200	600		2661	200
32	8	2228	200	200	0	8	2220	2220	*4770*	12561.5	200	200	600		2661	400
33	8	2420	200	200	0	8	2412	2412	*4962*	13767.5	200	200	600		2861	200
34	8	2612	200	200	0	8	2604	2604	*5156*	15069.5	200	200	600		2861	1000
35	8	2804	200	200	0	8	2796	2796	*5348*	16467.5	200	200	600		3661	1000
36	8	2996	200	200	0	8	2988	2988	*5548*	17961.5	838	200	600		4461	1000
37	8	3188	200	200	0	8	3180	3180	*5732*	19551.5	1862	838	1238		5261	1000
38	8	3380	200	838	0	8	3372	3372	*5918*	21237.5	0	1862	2900		6061	1000
39	8	3572	838	1862	0	8	3564	3564	*6748*	23019.5	100	0	2700		6223	200
40	8	4402	1862	0	0	8	4394	4394	*8604*	25218.5	200	100	1962		4561	400

A & W GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

				A&W ROOTBEER	Wholesaler		NO IT								A&W ROOTBEER
					Costs	$ 38,631.00									Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL	DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4		12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12	16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12	16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	4	4	12	16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	5	4	12	16	4	4	0	12	12	*12*
5	4	0	8	8	*8*	28	6	5	13	16	4	2	0	12	12	*12*
6	5	0	6	6	*6*	31	50	6	15	16	2	2	0	11	11	*12*
7	6	990	0	-990	*-990*	1021	1200	50	61	13	2	20	0	7	7	*11*
8	9	985	0	-985	*-1985*	2006	1500	1200	1256	9	20	2	41	0	-41	*-34*
9	20	979	0	-979	*-1979*	2985	0	1500	2750	20	2	50	1221	0	-1221	*-1221*
10	2	980	0	-980	*-70*	3965	0	0	2741	2	50	20	2719	0	-2719	*-1719*
11	50	960	0	-960	*-1950*	4925	0	0	2721	50	20	5	2669	0	-2669	*-1669*
12	20	958	0	-958	*-1958*	5883	0	0	2719	20	5	10	2649	0	-2649	*-1642*
13	5	908	0	-908	*-1908*	6791	0	0	2669	5	10	1000	2644	0	-2644	*-1637*
14	10	888	0	-888	*-1888*	7679	0	0	2649	10	1000	3000	2634	0	-2634	*-1627*
15	1000	883	0	-883	*-1883*	8562	0	0	2644	1000	3000	2965	1634	0	-1634	*-627*
16	1634	873	0	-873	*-1873*	9435	0	0	2634	3000	2965	1000	0	1366	1366	*1377*
17	0	0	127	127	*-873*	9498.5	300	0	1634	4331	1000	1000	0	4331	4331	*4438*
18	0	0	1761	1761	*-246*	10379	300	300	300	5331	1000	0	0	5331	5331	*5038*
19	300	0	761	761	*-1246*	10759.5	0	300	600	6331	0	0	0	6031	6031	*5038*
20	300	0	761	761	*-1946*	11140	0	0	600	6031	0	0	0	5731	5731	*5074*
21	0	0	1061	1061	*-1946*	11670.5	200	0	300	5731	0	0	0	5731	5731	*4738*
22	0	0	1361	1361	*-1646*	12351	200	200	200	5731	0	0	0	5731	5731	*3738*
23	200	0	1361	1361	*-646*	13031.5	200	200	400	5731	0	0	0	5531	5531	*3738*
24	200	0	1361	1361	*-646*	13712	500	200	600	5531	0	0	0	5331	5331	*3538*
25	200	0	1561	1561	*-446*	14492.5	200	500	900	5331	0	0	0	5131	5131	*3338*
26	500	0	1761	1761	*-246*	15373	200	200	900	5131	0	0	0	4631	4631	*3128*
27	200	0	1961	1961	*-46*	16353.5	200	200	900	4631	0	0	0	4431	4431	*2638*
28	200	0	2461	2461	*454*	17584	200	200	600	4431	0	0	0	4231	4231	*2438*
29	200	0	2461	2461	*0*	18814.5	400	200	600	4231	0	0	0	4031	4031	*2278*
30	200	0	2461	2461	*0*	20045	200	400	800	4031	0	0	0	3831	3831	*2038*
31	400	0	2461	2461	*0*	21275.5	1000	200	800	3831	0	0	0	3431	3431	*1838*
32	200	0	2461	2461	*0*	22506	1000	1000	1600	3431	0	0	0	3231	3231	*1438*
33	1000	0	2661	2661	*200*	23836.5	1000	1000	2200	3231	0	0	0	2231	2231	*1238*
34	1000	0	2661	2661	*200*	25167	1000	1000	3000	2231	0	3000	0	1231	1231	*-524*
35	1000	0	3461	3461	*1000*	26897.5	1000	1000	3000	1231	3000	1560	0	231	231	*-1762*
36	1000	0	4261	4261	*1038*	29028	200	1000	3000	3231	1560	0	0	2231	2231	*0*
37	1000	0	5061	5061	*838*	31558.5	400	200	2200	3791	0	0	0	2791	2791	*1238*
38	200	0	5223	5223	*1832*	34170	200	400	1600	2791	0	100	0	2591	2591	*1038*
39	400	0	4361	4361	*1000*	36350.5	100	200	800	2591	100	100	0	2191	2191	*1638*
40	200	0	4561	4561	*1200*	38631	100	100	700	2291	100	100	0	2091	2091	*1438*

A & W GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		NO IT								A&W ROOTBEER		Factory	NO IT		
	$ 63,075.00											Costs	$ 62,666.00			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	2	4	12		16	4	4	0	12	12	*12*	18	10	8	
4	24	2	2	10		16	4	10	0	12	12	*12*	24	50	14	
5	30	20	2	8		16	10	50	0	14	14	*14*	31	8	60	
6	35.5	2	20	24		24	50	8	0	22	22	*26*	42	2	58	
7	39	50	2	24		72	8	2	0	52	52	*52*	68	10	10	
8	80	1000	50	72		60	2	10	0	58	58	*58*	97	5	12	
9	1301	1000	1000	1052		60	10	5	0	10	10	*10*	102	10	15	
10	4020	2000	1000	2050		20	5	10	980	0	-980	*-980*	1082	1000	15	
11	6689	1000	2000	4000		5	10	1000	1975	0	-1975	*-1975*	3057	3000	1010	
12	9338	1000	1000	4980		10	1000	3000	3965	0	-3965	*-3965*	7022	8000	4000	
13	11982	1000	1000	5975		1000	3000	8000	3965	0	-3965	*-3965*	10987	1000	11000	
14	14616	1000	1000	6965		3000	8000	1000	1965	0	-1965	*-1965*	12952	500	9000	
15	16250	1000	1000	6965		8000	1000	500	0	5035	5035	*5035*	15469.5	10	1500	
16	16933	0	1000	4965		6035	500	10	0	5035	5035	*5035*	17987	5	510	
17	19098.5	0	0	2000		5535	10	5	0	4535	4535	*5535*	20254.5	10	15	
18	21764	0	0	1000		4545	5	10	0	4545	4545	*5535*	22527	0	15	
19	24779.5	0	0	0		4550	10	0	0	4550	4550	*5550*	24802	0	10	
20	27645	0	0	0		4560	0	0	0	4560	4560	*5560*	27082	0	0	
21	30510.5	0	0	0		4560	0	0	0	4560	4560	*5560*	29362	0	0	
22	33376	0	0	0		4560	0	0	0	4560	4560	*5560*	31642	0	0	
23	36141.5	0	0	0		4560	0	0	0	4560	4560	*5560*	33922	0	0	
24	38807	0	0	0		4560	0	0	0	4560	4560	*5560*	36202	0	0	
25	41372.5	0	0	0		4560	0	0	0	4560	4560	*5560*	38482	0	0	
26	43688	0	0	0		4560	0	0	0	4560	4560	*5560*	40762	0	0	
27	45903.5	0	0	0		4560	0	0	0	4560	4560	*5560*	43042	0	0	
28	48019	0	0	0		4560	0	0	0	4560	4560	*5560*	45322	0	0	
29	50034.5	0	0	0		4560	0	0	0	4560	4560	*5560*	47602	0	0	
30	51950	0	0	0		4560	0	0	0	4560	4560	*5560*	49882	0	0	
31	53665.5	0	0	0		4560	0	0	0	4560	4560	*5560*	52162	0	0	
32	55281	3000	0	0		4560	0	0	0	4560	4560	*5560*	54442	0	0	
33	56396.5	1600	3000	3000		4560	0	0	0	4560	4560	*5560*	56722	0	0	
34	57012	0	1600	4600		4560	0	0	0	1560	1560	*2560*	57502	0	0	
35	57127.5	1000	0	4600		1560	0	0	40	0	-40	*1560*	57542	100	0	
36	58243	0	1000	2600		0	0	100	40	0	-40	*1560*	57582	100	100	
37	59638.5	762	0	1040		0	100	100	1040	0	-1040	*560*	58822	100	200	
38	60934	0	762	1802		100	100	100	940	0	-940	*660*	59562	0	200	
39	62029.5	500	0	1802		100	100	0	1802	0	-1802	*0*	61164	300	100	
40	63075	0	500	2202		100	0	300	1502	0	-1502	*98*	62866	100	300	

A & W GAME MODEL WEEKS 21 TO 40 MODEL DATA

A&W ROOTBEER NO IT								
Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	8	12	4	12	2	12	10	12
4	6	12	5	12	2	12	50	12
5	1000	8	6	8	20	12	8	14
6	0	4	50	6	2	12	2	26
7	0	4	1200	-990	50	11	10	52
8	10	2	1500	-1985	1000	-34	5	58
9	0	4	0	-1979	1000	-1221	10	10
10	0	1	0	-70	2000	-1719	1000	-980
11	0	-1	0	-1950	1000	-1669	3000	-1975
12	0	0	0	-1958	1000	-1642	8000	-3965
13	0	12	0	-1908	1000	-1637	1000	-3965
14	0	6	0	-1888	1000	-1627	500	-1965
15	0	48	0	-1883	1000	-627	10	5035
16	0	65	0	-1873	0	1377	5	5035
17	1000	67	300	-873	0	4438	10	5535
18	0	1059	300	-246	0	5038	0	5535
19	0	1686	0	-1246	0	5038	0	5550
20	0	1678	0	-1946	0	5074	0	5560
21	0	1670	200	-1946	0	4738	0	5560
22	0	1967	200	-1646	0	3738	0	5560
23	0	2167	200	-646	0	3738	0	5560
24	0	3159	500	-646	0	3538	0	5560
25	0	3151	200	-446	0	3338	0	5560
26	0	3349	200	-246	0	3128	0	5560
27	200	3591	200	-46	0	2638	0	5560
28	200	3733	200	454	0	2438	0	5560
29	200	3736	400	0	0	2278	0	5560
30	200	4382	200	0	0	2038	0	5560
31	200	4578	1000	0	0	1838	0	5560
32	200	4770	1000	0	3000	1438	0	5560
33	200	4962	1000	200	1600	1238	0	5560
34	200	5156	1000	200	0	-524	0	2560
35	200	5348	1000	1000	1000	-1762	100	1560
36	838	5548	200	1038	0	0	100	1560
37	1862	5732	400	838	762	1238	100	560
38	0	5918	200	1832	0	1038	0	660
39	100	6748	100	1000	500	1638	300	0
40	200	8604	100	1200	0	1438	100	98

BIG BASS ALE GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.327198	15.21418	-11.21418	125.75776	12	12	12
2	4	0.16	4	-0.03145	15.01384	-11.01384	121.304693	12	12	12
3	4	0.31	8	0.790917	15.98825	-7.988254	63.812196	12	12	12
4	4	0.46	4	0.883359	15.39114	-11.39114	129.757984	12	12	16
5	8	0.60	10	0.037568	15.87851	-5.878506	34.5568302	8	8	16
6	8	0.89	10	-0.483415	15.59006	-5.590063	31.2488094	4	4	22
7	8	1.17	12	-1.079446	14.85765	-2.857652	8.16617544	4	4	24
8	8	1.44	14	0.817951	16.54706	-2.547061	6.48752054	0	0	32
9	8	1.70	15	1.554129	16.11077	-1.110773	1.23381731	2	2	36
10	8	1.95	10	0.790917	13.95593	-3.955926	15.6493538	4	4	41
11	8	2.19	8	0.883359	13.51269	-5.512687	30.3897224	8	8	39
12	8	2.42	8	0.037568	12.7182	-4.718195	22.2613646	10	10	37
13	8	2.64	8	-0.483415	12.59673	-4.596734	21.1299673	8	8	39
14	8	2.85	10	-1.079446	11.8555	-1.855498	3.44287255	12	12	35
15	8	3.06	8	0.817951	13.36016	-5.360162	28.7313369	14	14	35
16	8	3.25	6	1.554129	14.64932	-8.649325	74.8108167	10	10	39
17	8	3.44	8	0.790917	14.31316	-6.313161	39.8560071	12	12	35
18	8	3.62	0	0.883359	14.85408	-14.85408	220.643575	9	9	38
19	8	3.79	0	0.037568	15.22748	-15.22748	231.876076	16	16	23
20	8	3.96	0	-0.483415	16.36548	-16.36548	267.829042	18	18	13
21	8	4.12	1	-0.620585	18.32737	-17.32737	300.237709	15	15	8
22	8	4.27	10	0.573104	21.13689	-11.13689	124.030424	15	15	1
23	8	4.42	50	0.539992	21.54812	28.451879	809.509418	7	7	11
24	8	4.56	10	0.673126	13.46565	-3.465653	12.0107538	-1	0	61
25	8	4.70	10	-1.567747	9.480748	0.5192523	0.26962294	-8	0	70
26	8	4.83	10	0.899204	12.07835	-2.078353	4.31955061	-8	0	70
27	8	4.95	10	-0.009921	8.914377	1.0856231	1.17857746	36	36	30
28	8	5.08	0	-0.620585	7.827774	-7.827774	61.2740457	38	38	30
29	8	5.19	10	0.573104	10.62972	-0.629723	0.39655044	40	40	20
30	8	5.30	10	0.539992	10.11132	-0.111322	0.01239251	42	42	20
31	8	5.41	10	0.673126	9.754766	0.2452343	0.06013994	44	44	20
32	8	5.51	10	-1.567747	7.91329	2.0867104	4.35436033	36	36	30
33	8	5.61	10	0.899204	9.982267	0.1177332	0.01386111	38	38	30
34	8	5.70	10	-0.009921	8.471271	1.5287288	2.33701178	40	40	30
35	8	5.80	10	-0.620585	7.354993	2.6450075	6.99606458	42	42	30
36	9	5.88	10	0.573104	9.039471	1.9605286	3.84367233	44	44	30
37	10	6.01	10	0.539992	7.533275	2.4667248	6.08473124	46	46	30
38	11	6.16	10	0.673126	7.228019	2.7719812	7.68387981	48	48	30
39	12	6.36	10	-1.567747	4.582078	5.4179221	29.3538798	50	50	30
40	13	6.58	0	0.899204	6.675964	-6.675964	44.5684903	52	52	30
	mean of the disturbance			0.197716		-4.368489	mean of the standard errors			
	std dev of the disturbance			0.804336						

Σ (AO-Ot)2	1418.535		constraints		
θ	0.04		>=0	<=1	
αs	0.30		>=0	<=1	
β	0.70		>=0	<=100	INT
S'	70.32				

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

BIG BASS ALE GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	1.419093	4	-2.012496	11.03292	-7.032922	49.4619851	12	12	12
2	4	2.33473	4	-1.748042	12.21301	-8.213013	67.4535774	12	12	12
3	4	2.925523	8	1.125162	15.67701	-7.67701	58.9364802	12	12	12
4	8	3.308719	8	-0.645381	12.43418	-4.434184	19.6619852	12	12	16
5	4	4.971769	12	0.490911	15.98567	-3.98567	15.885563	8	8	20
6	10	4.627012	8	0.488757	11.9318	-3.9318	15.459053	8	8	28
7	10	6.533204	16	2.766336	17.41738	-1.417383	2.00897506	6	6	28
8	12	7.763131	12	1.549836	15.02566	-3.025663	9.15463473	4	4	36
9	14	9.266258	16	0.830118	16.18415	-0.184145	0.03390943	2	2	38
10	15	10.94566	20	-1.770425	12.85786	7.14214	51.0101637	-4	0	46
11	10	12.38403	24	0.630515	10.20999	13.790006	190.164258	-13	0	60
12	8	11.53824	20	0.561849	3.7351	16.2649	264.546988	-11	0	72
13	8	10.28297	16	0.088384	0	16	256	-9	0	82
14	8	9.473032	16	0.817084	0	16	256	-13	0	94
15	10	8.95044	20	-1.85362	0	20	400	-11	0	100
16	8	9.322796	20	1.458923	0	20	400	-16	0	115
17	6	8.853503	12	0.907956	0	12	144	-9	0	120
18	8	7.841157	6	-2.058818	0	6	36	-5	0	122
19	0	7.89751	6	-0.601857	0	6	36	-8	0	123
20	0	5.095685	1	-0.110363	0	1	1	22	22	99
21	0	3.287872	1	-0.894736	0	1	1	62	62	60
22	1	2.121423	1	0.040006	0	1	1	82	82	41
23	10	1.723572	1	0.712235	0	1	1	101	101	22
24	50	4.659827	1	0.926879	0	1	1	111	111	3
25	10	20.74531	4	0.271897	4.268576	-0.268576	0.07213284	62	62	3
26	10	16.93316	4	-0.439199	4.213374	-0.213374	0.0455283	53	53	6
27	10	14.47346	8	-0.561401	6.099513	1.9004869	3.61185052	44	44	9
28	10	12.8864	8	-1.28482	6.403593	1.5964067	2.54851442	35	35	16
29	0	11.86238	12	-1.11526	7.601091	4.3989087	19.3503974	29	29	20
30	10	7.653925	1	0.255728	0	1	1	33	33	28
31	10	8.48625	2	0.037031	3.612072	-1.612072	2.59877481	31	31	21
32	10	9.023288	4	-1.789152	6.404956	-2.404956	5.78381235	29	29	15
33	10	9.369799	8	0.609055	11.55482	-3.554821	12.6367507	31	31	7
34	10	9.593378	12	-0.561401	13.22251	-1.222505	1.49451936	22	22	14
35	10	9.737636	20	-1.28482	13.21689	6.7831065	46.0105332	14	14	24
36	10	9.830716	10	-1.11526	9.971051	0.0289492	0.00083806	8	8	40
37	10	9.890773	12	0.255728	11.77717	0.222832	0.04965409	6	6	42
38	10	9.929524	8	0.037031	10.29541	-2.295411	5.26891185	8	8	42
39	10	9.954527	6	-1.789152	7.545611	-1.545611	2.3889136	18	18	30
40	10	9.97066	10	0.609055	11.81343	-1.81343	3.28852711	18	18	28
	mean of the disturbance			-0.118947		2.9913675	mean of the standard errors			
	std dev of the disturbance			1.166839						

Σ (AO-Ot)2	110.1497		constraints		
θ	0.35		>=0	<=1	
αs	0.65		>=0	<=1	
β	0.71		>=0	<=1	
S'	38.40		>=0	<=100	INT

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0,eIO+\alpha s(s'-S_t-\beta SL_t)+\varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

BIG BASS ALE GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.254926	4	0.212321	2.539846	1.4601536	2.13204851	12	12	12
2	4	0.493605	4	-0.300218	2.265987	1.7340135	3.00680279	12	12	12
3	4	0.717072	6	1.272128	4.0618	1.9381999	3.75661894	12	12	12
4	8	0.926298	8	1.466757	4.465655	3.5343451	12.4915954	12	12	14
5	8	1.377115	6	-0.610599	3.044291	2.9557094	8.73621831	8	8	18
6	12	1.799201	12	1.623735	5.905884	6.094116	37.1382501	4	4	20
7	8	2.449313	10	0.059103	5.196538	4.8034622	23.0732494	-2	0	26
8	16	2.803066	4	-1.086482	4.404705	-0.404705	0.16378648	-2	0	28
9	12	3.644125	10	0.041564	6.373811	3.6261889	13.1492461	-12	0	26
10	16	4.176857	5	-0.011771	6.853008	-1.853008	3.4336396	-12	0	24
11	20	4.930176	24	0.207326	7.825624	16.174376	261.610429	-18	0	19
12	24	5.890597	30	0.153327	8.732047	21.267953	452.325842	-34	0	39
13	20	7.044735	24	0.233178	9.966036	14.033964	196.952157	-48	0	59
14	16	7.870393	24	-0.80675	9.751765	14.248235	203.012214	-63	0	78
15	16	8.388504	12	-0.945289	10.13134	1.8686625	3.49189944	-64	0	87
16	20	8.873596	12	0.338567	11.90029	0.0997147	0.00994302	-70	0	89
17	20	9.582698	24	0.390502	12.66132	11.338678	128.565622	-85	0	96
18	12	10.24661	40	1.041992	13.97672	26.023278	677.211018	-75	0	90
19	6	10.35835	24	0.212321	13.2588	10.741204	115.373461	-47	0	90
20	6	10.08059	12	-0.300218	12.46849	-0.468493	0.21948585	-33	0	94
21	1	9.820527	12	0.601544	13.11019	-1.110193	1.23252899	-19	0	86
22	1	9.258383	12	0.115908	10.52361	1.4763923	2.17973423	30	30	48
23	1	8.732064	0	1.345531	10.25234	-10.25234	105.110377	49	49	40
24	1	8.239289	12	0.218392	7.863018	4.1369815	17.1146161	64	64	24
25	1	7.777918	10	-1.800798	4.81823	5.1817699	26.8507391	75	75	24
26	4	7.345952	10	-0.772152	4.850681	5.1493188	26.5154846	86	86	22
27	4	7.13271	24	-0.85801	4.756755	19.243245	370.302486	82	82	32
28	8	6.933058	10	-1.074618	3.930146	6.0698535	36.8431217	90	90	44
29	8	7.001055	1	-1.433772	3.536403	-2.536403	6.43334212	92	92	44
30	12	7.06472	2	-0.836761	4.094491	-2.094491	4.38689233	94	94	35
31	1	7.379252	1	0.379529	5.009792	-4.009792	16.0784319	106	106	13
32	2	6.972693	1	-2.37159	1.390472	-0.390472	0.15246864	115	115	4
33	4	6.655776	0	0.2507	3.747139	-3.747139	14.0410494	114	114	4
34	8	6.48652	0	-0.338214	3.091556	-3.091556	9.5577183	112	112	2
35	12	6.582976	0	0.085365	3.970645	-3.970645	15.7660256	105	105	1
36	20	6.928211	1	-0.115924	4.678819	-3.678819	13.5337104	94	94	0
37	10	7.761295	5	-2.161768	4.491929	0.5080706	0.25813576	74	74	1
38	12	7.903971	5	-0.803447	6.505861	-1.505861	2.26761881	64	64	6
39	8	8.165016	5	0.444878	8.630755	-3.630755	13.1823795	52	52	11
40	6	8.1545	5	-1.770864	6.76355	-1.76355	3.11010718	45	45	15
	mean of the disturbance			-0.094213		4.2648738	mean of the standard errors			
	std dev of the disturbance			0.901227						

Σ (AO-Ot)2	684.917		constraints		
θ	0.06		>=0	<=1	
αs	0.05		>=0	<=1	
β	0.00		>=0	<=1	
S'	52.41		>=0	<=100	INT

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

BIG BASS ALE GAME MODEL WEEKS 21 TO 40

FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.278117	4	0.805862	8.26955	-4.26955	18.2290551	12	12	8
2	4	0.536896	4	-0.152018	7.570449	-3.570449	12.7481084	12	12	8
3	4	0.777683	4	-0.833986	7.129268	-3.129268	9.79231804	12	12	8
4	6	1.001728	4	-0.153383	8.033916	-4.033916	16.2724818	12	12	8
5	8	1.349254	8	0.424153	9.745025	-1.745025	3.04511362	10	10	8
6	6	1.811675	10	-0.949552	8.963954	1.0360459	1.07339118	6	6	12
7	12	2.102886	10	-0.123415	8.704527	1.2954732	1.6782508	4	4	18
8	10	2.791025	10	0.805862	11.1731	-1.173097	1.37615562	0	0	20
9	4	3.292259	10	-0.152018	10.71645	-0.716451	0.51330193	0	0	20
10	10	3.341468	4	1.611287	10.17082	-6.170823	38.0790566	6	6	20
11	5	3.80443	10	0.946505	12.13182	-2.131825	4.54467724	6	6	14
12	24	3.887557	5	0.92275	10.22608	-5.22608	27.3119088	11	11	14
13	30	5.285959	30	-1.578638	13.08588	16.914118	286.087373	-9	0	15
14	24	7.004307	40	0.120896	9.294358	30.705642	942.836449	-29	0	35
15	24	8.186004	20	-0.439325	0	20	400	-48	0	70
16	12	9.285539	20	0.693802	3.136738	16.863262	284.369613	-42	0	60
17	12	9.474273	50	0.797547	10.63862	39.361377	1549.31798	-14	0	40
18	24	9.649885	20	-1.528192	0	20	400	-6	0	70
19	40	10.64764	20	1.09998	1.300312	18.699688	349.678349	-10	0	70
20	24	12.68848	10	-0.903276	12.15201	-2.152011	4.63114986	0	0	40
21	12	13.47496	10	0.290247	17.73672	-7.736718	59.8568059	-4	0	30
22	12	13.37241	20	-0.156326	19.2202	0.7797991	0.60808664	4	4	20
23	12	13.27699	20	-0.418273	16.04418	3.9558248	15.6485497	2	2	30
24	0	13.1882	10	1.687841	15.24285	-5.242845	27.487426	0	0	40
25	12	12.27124	10	-0.592103	7.790168	2.2098321	4.88335791	20	20	30
26	10	12.25238	10	-0.153231	8.670696	1.3293038	1.76704857	28	28	20
27	10	12.09577	10	-0.831409	7.835911	2.1640885	4.68327915	28	28	20
28	24	11.95005	10	-0.756734	7.764869	2.2351305	4.99580845	28	28	20
29	10	12.78788	20	-0.059773	14.80198	5.1980164	27.0193748	14	14	20
30	1	12.59404	10	0.084654	11.14787	-1.147869	1.3176023	14	14	30
31	2	11.78791	10	-0.639292	6.080586	3.919414	15.3618065	23	23	30
32	1	11.10737	0	-0.198002	2.37161	-2.37161	5.62453362	41	41	20
33	1	10.40461	0	-0.635082	1.299263	-1.299263	1.68808533	50	50	10
34	0	9.750715	0	-0.846998	0.500953	-0.500953	0.25095439	59	59	0
35	0	9.072756	0	-1.274359	0	0	0	59	59	0
36	0	8.441934	0	-0.887401	0	0	0	59	59	0
37	1	7.854973	0	-0.50182	0	0	0	59	59	0
38	5	7.378352	0	0.557404	0	0	0	58	58	0
39	5	7.212987	0	-0.515452	0.652903	-0.652903	0.42628251	53	53	0
40	5	7.05912	0	-0.156326	2.82328	-2.82328	7.97090741	48	48	0
	mean of the disturbance			-0.088114		3.8299789	mean of the standard errors			
	std dev of the disturbance			0.829331						

Σ (AO-Ot)2	179.5899		constraints		
θ	0.07		>=0	<=1	
αs	0.39		>=0	<=1	
β	0.92		>=0	<=1	
S'	37.62		>=0	<=100	INT

GRG NonLinear

Incoming Orders:

IO = FIO

Expected Incoming Orders:

$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:

AO = FPR

Disturbance:

normally distributed white noise

mean = 0

std dev = 1

Model Orders:

$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$

Error Term:

$AO - O_t$

Squared errors:

$(AO - O_t)^2$

Effective Inventory:

EI = MFEI

Stock:

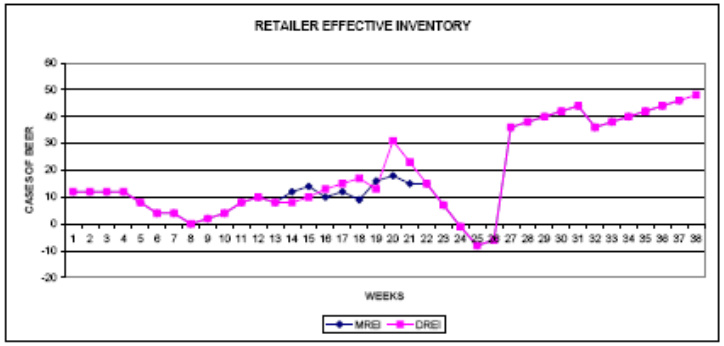
St = MAX(0,EI)

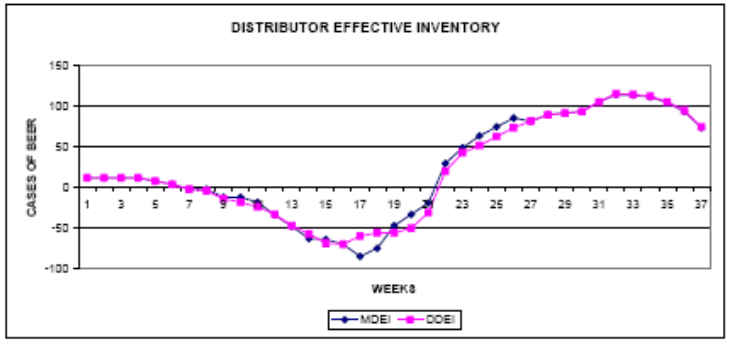
Supply Line:

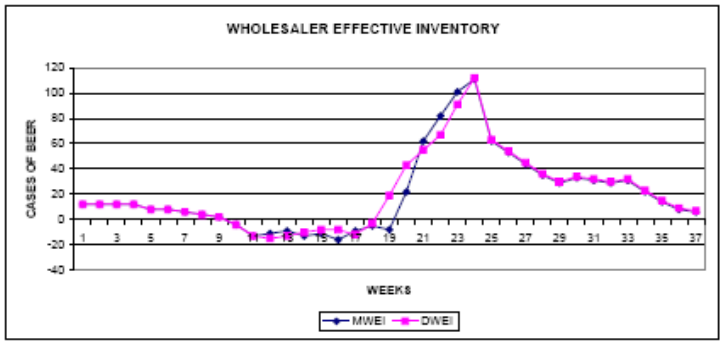
SLt = FSL = FPD1+FPD2

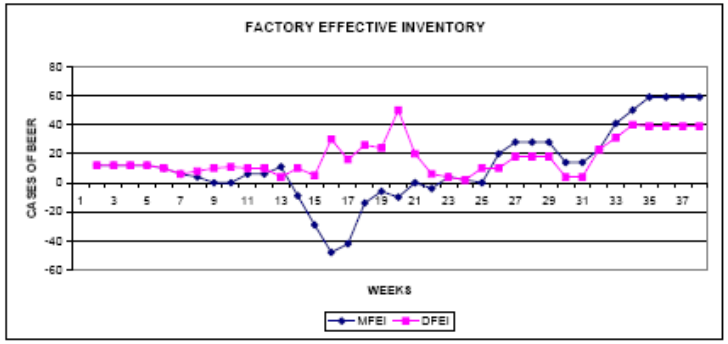
BIG BASS ALE GAME MODEL WEEKS 21 TO 40

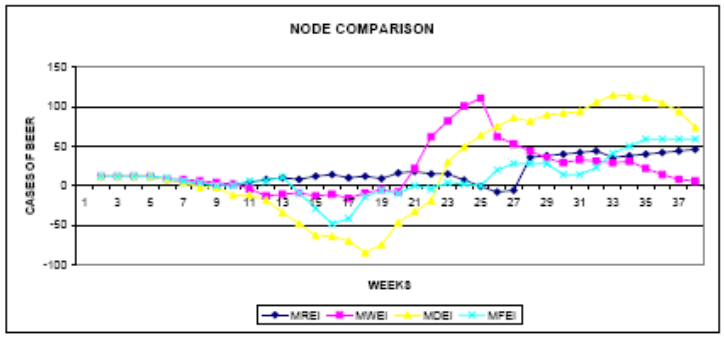
MODEL CHARTS





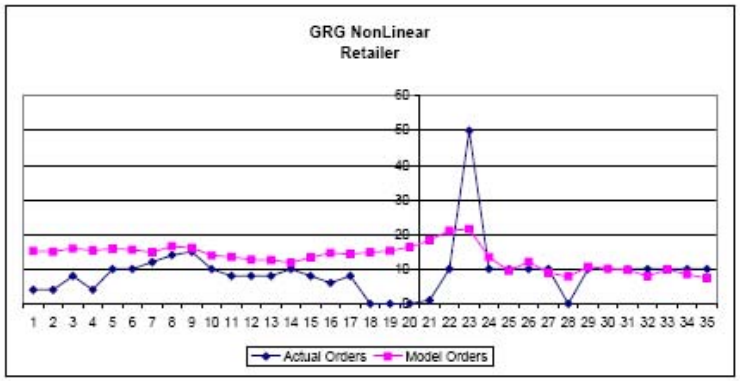


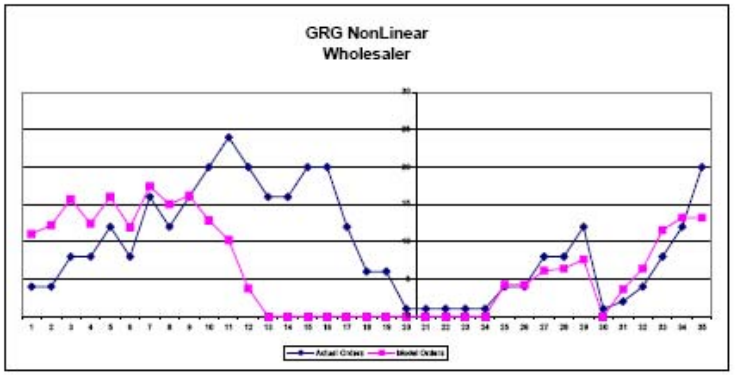


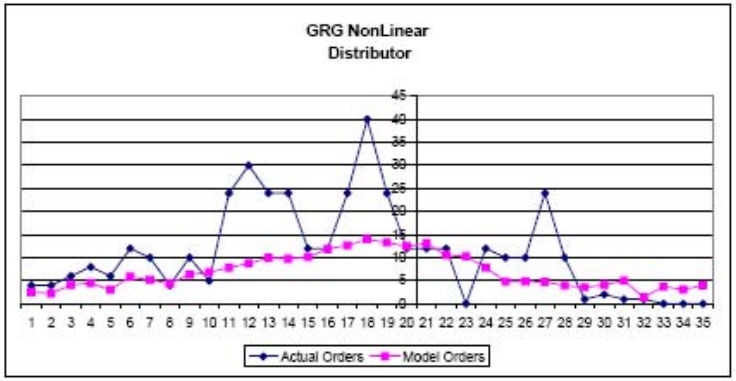


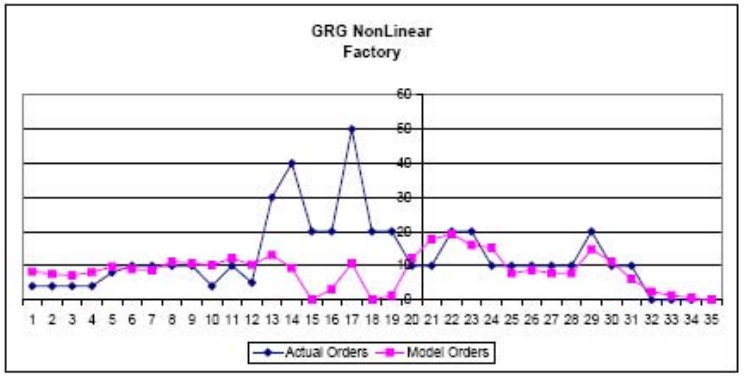
BIG BASS ALE GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









BIG BASS ALE GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	BIG BASS ALE	NO IT						BIG BASS ALE		Retailer	NO IT					
	Team Costs	$ 2,888.00							Costs	$ 425.00						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	8	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	4	8	16		16	4
5	8	16	4	8	0	8	8	8	*8*	28	10	4	16		16	4
6	8	12	8	4	0	8	4	4	*4*	30	10	10	22		12	8
7	8	12	4	10	0	8	4	4	*4*	32	12	10	24		16	8
8	8	8	10	10	0	8	0	0	*0*	32	14	12	32		14	10
9	8	10	10	12	0	8	2	2	*2*	33	15	14	36		14	8
10	8	12	12	10	0	8	4	4	*4*	35	10	15	41		10	6
11	8	16	10	6	0	8	8	8	*8*	39	8	10	39		6	12
12	8	18	6	12	0	8	10	10	*10*	44	8	8	37		12	10
13	8	16	12	10	0	8	8	8	*8*	48	8	8	39		10	4
14	8	20	10	4	0	8	12	12	*8*	54	10	8	35		4	10
15	8	22	4	10	0	8	14	14	*10*	61	8	10	35		10	5
16	8	18	10	5	0	8	10	10	*13*	66	6	8	39		5	15
17	8	20	5	15	0	8	12	12	*15*	72	8	6	35		15	10
18	8	17	15	10	0	8	9	9	*17*	76.5	0	8	38		10	5
19	8	24	10	5	0	8	16	16	*13*	84.5	0	0	23		5	30
20	8	26	5	8	0	8	18	18	*31*	93.5	0	0	13		30	40
21	8	23	8	0	0	8	15	15	*23*	101	1	0	8		62	20
22	8	23	0	0	0	8	15	15	*15*	108.5	10	1	1		82	20
23	8	15	0	1	0	8	7	7	*7*	112	50	10	11		102	20
24	8	7	1	10	1	7	0	-1	*-1*	113	10	50	61		121	1
25	8	1	10	50	8	1	0	-8	*-8*	121	10	10	70		112	1
26	8	10	50	10	6	10	0	-6	*-6*	127	10	10	70		63	1
27	8	50	10	10	0	14	36	36	*36*	145	10	10	30		54	1
28	8	46	10	10	0	8	38	38	*38*	164	0	10	30		45	4
29	8	48	10	10	0	8	40	40	*40*	184	10	0	20		39	4
30	8	50	10	0	0	8	42	42	*42*	205	10	10	20		33	8
31	8	52	0	10	0	8	44	44	*44*	227	10	10	20		41	8
32	8	44	10	10	0	8	36	36	*36*	245	10	10	30		39	12
33	8	46	10	10	0	8	38	38	*38*	264	10	10	30		41	1
34	8	48	10	10	0	8	40	40	*40*	284	10	10	30		32	2
35	8	50	10	10	0	8	42	42	*42*	305	10	10	30		24	4
36	8	52	10	10	0	8	44	44	*44*	327	10	10	30		18	8
37	8	54	10	10	0	8	46	46	*46*	350	10	10	30		16	12
38	8	56	10	10	0	8	48	48	*48*	374	10	10	30		18	20
39	8	58	10	10	0	8	50	50	*50*	399	10	10	30		28	10
40	8	60	10	10	0	8	52	52	*52*	425	0	10	30		28	12

BIG BASS ALE GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

	STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews						
					BIG BASS ALE	Wholesaler		NO IT									BIG BASS ALE
					Costs	$ 546.50											Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	8	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	8	8	16		16	4	4	0	12	12	*12*
5	8	0	8	8	*8*	28	12	8	20		16	4	6	0	8	8	*8*
6	8	0	8	8	*8*	32	8	12	28		12	6	8	0	4	4	*4*
7	10	0	6	6	*6*	36	16	8	28		10	8	6	2	0	-2	*-2*
8	8	0	4	4	*4*	37	12	16	36		8	6	12	2	0	-2	*-4*
9	6	0	2	2	*2*	38	16	12	38		6	12	10	12	0	-12	*-14*
10	12	4	0	-4	*-4*	42	20	16	46		12	10	4	12	0	-12	*-18*
11	10	13	0	-13	*-13*	55	24	20	60		10	4	10	18	0	-18	*-24*
12	4	11	0	-11	*-15*	66	20	24	72		4	10	5	34	0	-34	*-33*
13	10	9	0	-9	*-13*	75	16	20	82		10	5	15	48	0	-48	*-47*
14	5	13	0	-13	*-10*	88	16	16	94		5	15	10	63	0	-63	*-57*
15	15	11	0	-11	*-8*	99	20	16	100		15	10	5	64	0	-64	*-69*
16	10	16	0	-16	*-8*	115	20	20	115		10	5	30	70	0	-70	*-70*
17	5	9	0	-9	*-12*	124	12	20	120		5	30	40	85	0	-85	*-60*
18	30	5	0	-5	*-3*	129	6	12	122		30	40	20	75	0	-75	*-56*
19	40	8	0	-8	*19*	137	6	6	123		40	20	20	47	0	-47	*-56*
20	20	0	22	22	*43*	148	1	6	99		20	20	50	33	0	-33	*-50*
21	20	0	62	62	*55*	179	1	1	60		20	50	20	19	0	-19	*-31*
22	20	0	82	82	*67*	220	1	1	41		50	20	16	0	30	30	*20*
23	1	0	101	101	*91*	270.5	1	1	22		50	16	12	0	49	49	*43*
24	1	0	111	111	*112*	326	1	1	3		65	12	12	0	64	64	*52*
25	1	0	62	62	*63*	357	4	1	3		76	12	0	0	75	75	*63*
26	1	0	53	53	*54*	383.5	4	4	6		87	0	12	0	86	86	*74*
27	4	0	44	44	*45*	405.5	8	4	9		86	12	10	0	82	82	*82*
28	4	0	35	35	*36*	423	8	8	16		94	10	10	0	90	90	*90*
29	8	0	29	29	*30*	437.5	12	8	20		100	10	24	0	92	92	*92*
30	8	0	33	33	*34*	454	1	12	28		102	24	10	0	94	94	*94*
31	12	0	31	31	*32*	469.5	2	1	21		118	10	1	0	106	106	*106*
32	1	0	29	29	*30*	484	4	2	15		116	1	2	0	115	115	*116*
33	2	0	31	31	*32*	499.5	8	4	7		116	2	1	0	114	114	*115*
34	4	0	22	22	*23*	510.5	12	8	14		116	1	1	0	112	112	*113*
35	8	0	14	14	*15*	517.5	20	12	24		113	1	0	0	105	105	*106*
36	12	0	8	8	*9*	521.5	10	20	40		106	0	0	0	94	94	*95*
37	20	0	6	6	*7*	524.5	12	10	42		94	0	0	0	74	74	*75*
38	10	0	8	8	*9*	528.5	8	12	42		74	0	1	0	64	64	*65*
39	12	0	18	18	*19*	537.5	6	8	30		64	1	5	0	52	52	*53*
40	8	0	18	18	*19*	546.5	10	6	26		53	5	5	0	45	45	*46*

BIG BASS ALE GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		NO IT									BIG BASS ALE	Factory	NO IT		
	$ 1,385.50											Costs	$ 531.00			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	6	4	12		16	4	4	0	12	12	*12*	18	4	8	
4	24	8	6	14		16	4	4	0	12	12	*12*	24	4	8	
5	28	6	8	18		16	4	4	0	10	10	*10*	29	8	8	
6	30	12	6	20		14	4	8	0	6	6	*6*	32	10	12	
7	32	10	12	26		10	8	10	0	4	4	*8*	34	10	18	
8	34	4	10	28		12	10	10	0	0	0	*10*	34	10	20	
9	46	10	4	26		10	10	10	0	0	0	*11*	34	10	20	
10	58	5	10	24		10	10	10	0	6	6	*10*	37	4	20	
11	76	24	5	19		16	10	4	0	6	6	*10*	40	10	14	
12	110	30	24	39		16	4	10	0	11	11	*4*	45.5	5	14	
13	158	24	30	59		15	10	5	9	0	-9	*10*	54.5	30	15	
14	221	24	24	78		10	5	30	29	0	-29	*5*	83.5	40	35	
15	285	12	24	87		5	30	40	48	0	-48	*30*	131.5	20	70	
16	355	12	12	89		30	40	20	42	0	-42	*16*	173.5	20	60	
17	440	24	12	96		40	20	20	14	0	-14	*26*	187.5	50	40	
18	515	40	24	90		20	20	50	6	0	-6	*24*	193.5	20	70	
19	562	24	40	90		20	50	20	10	0	-10	*50*	203.5	20	70	
20	595	12	24	94		50	20	20	0	0	0	*20*	203.5	10	40	
21	614	12	12	86		20	20	10	4	0	-4	*6*	207.5	10	30	
22	629	12	12	48		20	10	10	0	4	4	*4*	209.5	20	20	
23	653.5	0	12	40		14	10	20	0	2	2	*2*	210.5	20	30	
24	685.5	12	0	24		12	20	20	0	0	0	*10*	210.5	10	40	
25	723	10	12	24		20	20	10	0	20	20	*10*	220.5	10	30	
26	766	10	10	22		40	10	10	0	28	28	*18*	234.5	10	20	
27	807	24	10	32		38	10	10	0	28	28	*18*	248.5	10	20	
28	852	10	24	44		38	10	10	0	28	28	*18*	262.5	10	20	
29	898	1	10	44		38	10	10	0	14	14	*4*	269.5	20	20	
30	945	2	1	35		24	10	20	0	14	14	*4*	276.5	10	30	
31	998	1	2	13		24	20	10	0	23	23	*23*	288	10	30	
32	1055.5	1	1	4		43	10	10	0	41	41	*31*	308.5	0	20	
33	1112.5	0	1	4		51	10	0	0	50	50	*40*	333.5	0	10	
34	1168.5	0	0	2		60	0	0	0	59	59	*39*	363	0	0	
35	1221	0	0	1		59	0	0	0	59	59	*39*	392.5	0	0	
36	1268	1	0	0		59	0	0	0	59	59	*39*	422	0	0	
37	1305	5	1	1		59	0	0	0	59	59	*39*	451.5	0	0	
38	1337	5	5	6		59	0	0	0	58	58	*38*	480.5	0	0	
39	1363	5	5	11		58	0	0	0	53	53	*33*	507	0	0	
40	1385.5	5	5	15		53	0	0	0	48	48	*28*	531	0	0	

BIG BASS ALE GAME MODEL WEEKS 21 TO 40

MODEL DATA

BIG BASS ALE NO IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	8	12	8	12	6	12	4	12
4	4	12	8	12	8	12	4	12
5	10	8	12	8	6	8	8	10
6	10	4	8	8	12	4	10	6
7	12	4	16	6	10	-2	10	8
8	14	0	12	4	4	-4	10	10
9	15	2	16	2	10	-14	10	11
10	10	4	20	-4	5	-18	4	10
11	8	8	24	-13	24	-24	10	10
12	8	10	20	-15	30	-33	5	4
13	8	8	16	-13	24	-47	30	10
14	10	8	16	-10	24	-57	40	5
15	8	10	20	-8	12	-69	20	30
16	6	13	20	-8	12	-70	20	16
17	8	15	12	-12	24	-60	50	26
18	0	17	6	-3	40	-56	20	24
19	0	13	6	19	24	-56	20	50
20	0	31	1	43	12	-50	10	20
21	1	23	1	55	12	-31	10	6
22	10	15	1	67	12	20	20	4
23	50	7	1	91	0	43	20	2
24	10	-1	1	112	12	52	10	10
25	10	-8	4	63	10	63	10	10
26	10	-6	4	54	10	74	10	18
27	10	36	8	45	24	82	10	18
28	0	38	8	36	10	90	10	18
29	10	40	12	30	1	92	20	4
30	10	42	1	34	2	94	10	4
31	10	44	2	32	1	106	10	23
32	10	36	4	30	1	116	0	31
33	10	38	8	32	0	115	0	40
34	10	40	12	23	0	113	0	39
35	10	42	20	15	0	106	0	39
36	10	44	10	9	1	95	0	39
37	10	46	12	7	5	75	0	39
38	10	48	8	9	5	65	0	38
39	10	50	6	19	5	53	0	33
40	0	52	10	19	5	46	0	28

BIRA GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.451023	54.11609	-50.11609	2511.62198	12	12	12
2	4	1.18	4	0.53677	55.38354	-51.38354	2640.26773	12	12	12
3	4	2.01	4	-0.350935	55.32843	-51.32843	2634.60756	12	12	12
4	4	2.60	4	0.759146	57.02514	-53.02514	2811.66513	12	12	12
5	8	3.01	8	-0.833515	58.48415	-50.48415	2548.64944	8	8	12
6	8	4.49	8	-1.16083	61.4676	-53.4676	2858.78377	4	4	16
7	8	5.52	8	1.239622	66.74267	-58.74267	3450.70115	0	0	20
8	8	6.26	8	-2.188787	63.24596	-55.24596	3052.1162	-4	0	24
9	8	6.77	8	-0.51426	65.43565	-57.43565	3299.85361	-4	0	24
10	8	7.13	8	1.392472	67.70536	-59.70536	3564.7302	-4	0	24
11	8	7.39	8	0.153059	65.92118	-57.92118	3354.86354	-8	0	28
12	8	7.57	8	1.429418	66.57722	-58.57722	3431.29119	-12	0	32
13	8	7.70	8	-0.128154	64.74635	-56.74635	3220.14879	-14	0	34
14	8	7.79	8	0.208851	65.17281	-57.17281	3268.73044	-14	0	34
15	8	7.85	8	0.303251	64.92998	-56.92998	3241.02282	-16	0	36
16	8	7.89	12	-0.907694	62.36255	-50.36255	2536.38599	-23	0	43
17	8	7.93	17	-0.388832	60.91141	-43.91141	1928.21228	-29	0	53
18	8	7.95	23	0.75747	59.67822	-36.67822	1345.29192	-32	0	65
19	8	7.96	26	-0.261071	56.07355	-30.07355	904.418128	-30	0	78
20	8	7.97	26	-0.990847	50.35151	-24.35151	592.995948	-37	0	103
21	8	7.98	34	-0.623191	45.52354	-11.52354	132.791997	-45	0	129
22	8	7.99	40	1.816473	41.56453	-1.564535	2.4477693	-51	0	161
23	8	7.99	48	-0.340144	33.4079	14.5921	212.929395	-49	0	191
24	8	7.99	36	-0.076519	28.07063	7.9293677	62.8748723	-37	0	219
25	8	8.00	34	-0.557317	22.3884	11.611599	134.829225	-35	0	245
26	8	8.00	22	0.993524	23.14007	-1.140068	1.29975443	-13	0	249
27	8	8.00	20	0.408151	18.15282	1.8471822	3.41208222	-21	0	271
28	8	8.00	8	0.079756	15.82381	-7.823806	61.2119338	-19	0	281
29	8	8.00	8	0.669367	18.83794	-10.83794	117.480952	3	3	259
30	8	8.00	8	2.096016	14.7514	-6.751399	45.5813852	15	15	247
31	8	8.00	8	-0.632999	8.806396	-0.806396	0.65027402	22	22	240
32	8	8.00	8	-0.399208	3.526829	4.4731706	20.0092553	34	34	228
33	8	8.00	8	1.239303	0	8	64	106	106	156
34	8	8.00	0	1.687942	0	0	0	238	238	24
35	8	8.00	0	-0.102072	0	0	0	238	238	16
36	9	8.00	0	1.557498	0	0	0	238	238	8
37	10	8.30	0	2.222788	0	0	0	238	238	0
38	11	8.80	0	1.232395	0	0	0	230	230	0
39	12	9.45	0	-0.623191	0	0	0	222	222	0
40	13	10.20	0	1.816473	0	0	0	214	214	0
	mean of the disturbance			0.164693		-28.73296	mean of the standard errors			
	std dev of the disturbance			0.950336						

Σ (AO-Ot)2	859.4988	constraints		
θ	0.30	>=0	<=1	
αs	0.66	>=0	<=1	
β	0.30	>=0	<=1	
S'	97.00	>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

BIRA GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	-1.290257	24.63728	-20.63728	425.897437	12	12	12
2	4	4	4	0.311361	26.2389	-22.2389	494.568707	12	12	12
3	4	4	4	-0.210392	25.71715	-21.71715	471.634507	12	12	12
4	4	4	4	1.127454	27.05499	-23.05499	531.532751	12	12	12
5	4	4	0	-0.594987	25.33255	-25.33255	641.738224	12	12	12
6	8	4	4	-0.564423	25.40628	-21.40628	458.228933	12	12	8
7	8	8	6	-1.34184	32.62887	-26.62887	709.096459	8	8	8
8	8	8	8	0.127963	38.07709	-30.07709	904.631087	4	4	10
9	8	8	10	-0.814138	41.04865	-31.04865	964.018934	-4	0	18
10	8	8	8	-0.49904	41.299	-33.299	1108.82372	-8	0	24
11	8	8	20	0.229126	42.00559	-22.00559	484.245902	-10	0	26
12	8	8	18	1.687813	43.33458	-25.33458	641.840932	-10	0	38
13	8	8	16	1.797615	43.31509	-27.31509	746.113924	-12	0	50
14	8	8	12	-0.413401	40.9422	-28.9422	837.651013	-19	0	65
15	8	8	20	-0.889222	40.35847	-20.35847	414.467194	-25	0	75
16	8	8	0	-0.668838	40.41698	-40.41698	1633.53246	-28	0	90
17	12	8	30	-0.170361	41.02337	-11.02337	121.514725	-26	0	80
18	17	12	40	0.105195	44.98598	-4.985981	24.8600051	-37	0	109
19	23	17	40	0.915	50.36413	-10.36413	107.415279	-54	0	149
20	26	23	40	0.451023	55.49009	-15.49009	239.942864	-75	0	187
21	26	26	30	-0.962854	56.75247	-26.75247	715.694844	-91	0	217
22	34	26	30	-0.199844	57.40757	-27.40757	751.174925	-97	0	227
23	40	34	90	0.482795	65.87438	24.125616	582.045328	-121	0	247
24	48	40	100	-1.187654	69.55646	30.443542	926.809236	-131	0	307
25	36	48	100	-0.303236	77.36175	22.638252	512.490438	-179	0	407
26	34	36	0	1.049431	65.7432	-65.7432	4322.16847	-205	0	497
27	22	34	50	-0.99017	62.02734	-12.02734	144.656848	-209	0	467
28	20	22	100	-0.700175	49.99359	50.006405	2500.64059	-211	0	497
29	8	20	100	-0.6359	47.14061	52.85939	2794.11509	-216	0	582
30	8	8	20	-0.971372	33.94184	-13.94184	194.374793	-204	0	662
31	8	8	0	-1.3599	34.20079	-34.20079	1169.69373	-132	0	602
32	8	8	0	0.301737	0	0	0	60	60	402
33	8	8	8	-0.842971	0	8	64	152	152	302
34	8	8	0	-0.668255	0	0	0	344	344	110
35	0	8	0	1.039047	0	0	0	438	438	8
36	0	0	0	2.244765	0	0	0	438	438	8
37	0	0	0	-1.055511	0	0	0	446	446	0
38	0	0	0	-0.300071	0	0	0	446	446	0
39	0	0	8	-0.199844	0	8	64	446	446	0
40	0	0	0	0.482795	0	0	0	446	446	8
	mean of the disturbance			-0.190111		-12.96221	mean of the standard errors			
	std dev of the disturbance			0.851207						

Σ (AO-Ot)2	14741.86		constraints	
θ	1.00		>=0	<=1
αs	1.00		>=0	<=1
β	0.01		>=0	<=1
S'	34.06		>=0	<=100

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

BIRA GAME MODEL WEEKS 21 TO 40

DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.002025	4	1.068881	89.07091	-85.07091	7237.05917	12	12	12
2	4	0.004049	4	-0.402695	87.60135	-83.60135	6989.1864	12	12	12
3	4	0.006073	2	-0.977584	87.02849	-85.02849	7229.84396	12	12	12
4	4	0.008095	3	0.726321	88.73442	-85.73442	7350.39012	12	12	10
5	4	0.010116	2	0.949452	88.95957	-86.95957	7561.96654	12	12	9
6	0	0.012136	3	1.232409	89.24454	-86.24454	7438.12147	12	12	7
7	4	0.01213	2	-1.145155	84.86697	-82.86697	6866.93554	14	14	8
8	6	0.014149	1	-0.24748	86.76669	-85.76669	7355.92492	13	13	7
9	8	0.01718	2	-0.180662	90.83652	-88.83652	7891.92697	9	9	6
10	10	0.021222	5	1.613543	97.63476	-92.63476	8581.19957	4	4	5
11	8	0.026274	10	-0.491373	99.5349	-89.5349	8016.49845	-4	0	8
12	20	0.030311	10	2.035063	102.0654	-92.06537	8476.03308	-11	0	17
13	18	0.040422	25	-0.619928	99.42049	-74.42049	5538.40992	-29	0	25
14	16	0.049515	50	-0.839882	99.20963	-49.20963	2421.58795	-42	0	45
15	12	0.057591	10	-0.577657	99.47993	-89.47993	8006.65855	-48	0	85
16	20	0.063638	25	0.535392	100.599	-75.59903	5715.21328	-59	0	94
17	0	0.073732	50	-0.38589	99.68784	-49.68784	2468.88162	-79	0	119
18	30	0.073694	20	-0.488599	99.60509	-79.60509	6336.97113	-77	0	167
19	40	0.088846	10	-1.268866	98.81998	-88.81998	7888.98883	-97	0	177
20	40	0.109054	40	1.068881	101.1779	-61.17794	3742.73976	-117	0	167
21	40	0.129251	50	0.486769	100.616	-50.61602	2561.98146	-147	0	197
22	30	0.149438	50	0.360773	100.5102	-50.51021	2551.28141	-157	0	217
23	30	0.164652	100	-1.231461	98.93309	1.0669097	1.13829621	-187	0	267
24	90	0.179658	200	-1.203978	98.97568	101.02432	10205.9133	-207	0	357
25	100	0.225135	200	-0.010357	100.2148	99.785222	9957.09049	-267	0	527
26	100	0.275652	200	-0.198386	100.0773	99.922734	9984.55284	-347	0	707
27	0	0.326144	100	-1.956354	98.36979	1.6302104	2.65758601	-432	0	892
28	50	0.325978	100	0.486769	100.8127	-0.812747	0.66055806	-412	0	972
29	100	0.351129	200	0.360773	100.7119	99.288098	9858.12644	-382	0	992
30	100	0.401582	50	-1.231461	99.17012	-49.17012	2417.70079	-282	0	992
31	20	0.45201	50	-1.203978	99.24803	-49.24803	2425.36866	-282	0	942
32	0	0.461908	0	-0.010357	100.4516	-100.4516	10090.5141	-102	0	792
33	0	0.461674	0	-0.198386	2.263287	-2.263287	5.12246933	98	98	592
34	8	0.46144	0	-0.522545	0	0	0	198	198	492
35	0	0.465257	0	-1.899287	0	0	0	240	240	442
36	0	0.465021	0	1.703536	0	0	0	340	340	342
37	0	0.464786	0	-0.559388	0	0	0	390	390	292
38	0	0.46455	0	-0.070762	0	0	0	390	390	292
39	0	0.464315	0	-1.067177	0	0	0	390	390	292
40	8	0.46408	0	-0.060378	0	0	0	390	390	292
		mean of the disturbance		-0.181351		-43.21997	mean of the standard errors			
		std dev of the disturbance		0.966083						

Σ (AO-Ot)2	60082.11	constraints		
θ	0.00	>=0	<=1	
αs	1.00	>=0	<=1	
β	0.00	>=0	<=1	
S'	100.00	>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

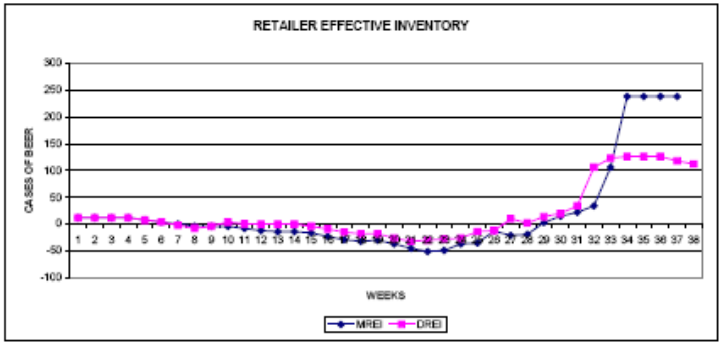
BIRA GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

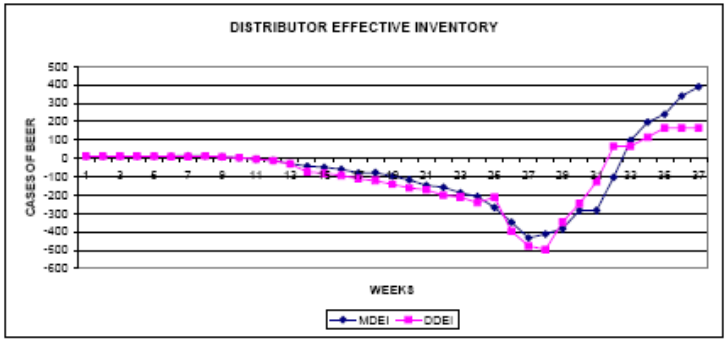
FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	3.133149	4	-0.361949	1.691008	2.3089918	5.33144332	12	12	8
2	4	3.812142	4	0.670565	3.402516	0.5974844	0.35698757	12	12	8
3	4	3.959289	4	-2.260884	0.618213	3.3817875	11.4364866	12	12	8
4	2	3.991177	6	-0.355166	2.555819	3.444181	11.8623825	12	12	8
5	3	2.431514	5	0.543896	1.429998	3.5700016	12.7449113	14	14	10
6	2	2.876802	0	-1.909474	0	0	0	15	15	11
7	3	2.190014	0	-0.275382	0.235403	-0.235403	0.05541445	19	19	5
8	2	2.824466	0	-1.399516	0.000962	-0.000962	9.2518E-07	21	21	0
9	1	2.178672	0	0.179406	1.193464	-1.193464	1.42435702	19	19	0
10	2	1.255433	0	-0.696638	0	0	0	18	18	0
11	5	1.838643	0	0.573448	1.636537	-1.636537	2.67825241	16	16	0
12	10	4.314893	0	1.982714	6.170486	-6.170486	38.0748943	11	11	0
13	10	8.767964	2	-0.093926	9.843784	-7.843784	61.52494	1	1	0
14	25	9.733002	10	1.760875	12.58746	-2.587463	6.69496316	-9	0	2
15	50	21.69145	20	-1.631158	20.12464	-0.124644	0.01553601	-34	0	12
16	10	43.86517	10	-0.167081	41.90983	-31.90983	1018.23752	-82	0	30
17	25	17.33902	30	0.90699	16.45774	13.542261	183.392833	-82	0	30
18	50	23.33977	0	-0.064984	20.45729	-20.45729	418.500902	-87	0	40
19	20	44.22239	10	-1.042201	41.39193	-31.39193	985.453001	-127	0	30
20	10	25.2493	30	-1.16626	24.35324	5.6467567	31.8858615	-117	0	10
21	40	13.30472	20	-0.56922	9.918011	10.081989	101.646501	-127	0	40
22	50	34.21479	15	1.562133	31.93021	-16.93021	286.631843	-157	0	50
23	50	46.57914	20	-1.136369	43.1399	-23.1399	535.454985	-177	0	35
24	100	49.25886	80	-1.556521	45.39926	34.600738	1197.2111	-207	0	35
25	200	89.0037	200	0.77309	80.78392	119.21608	14212.4735	-292	0	100
26	200	175.9457	100	-0.080067	148.3466	-48.3466	2337.39378	-472	0	280
27	200	194.7871	200	-2.256533	162.9531	37.046885	1372.47168	-592	0	300
28	100	198.8703	200	-0.330222	168.9626	31.037391	963.319659	-592	0	300
29	100	121.4265	100	0.955932	82.51262	17.487379	305.808415	-592	0	400
30	200	104.6434	50	-0.227547	74.83837	-24.83837	616.944629	-492	0	300
31	50	179.335	100	-0.459586	164.7364	-64.73639	4190.80062	-492	0	150
32	50	78.02855	50	-0.735938	63.1536	-13.1536	173.017066	-442	0	150
33	0	56.07415	0	-0.485389	41.44974	-41.44974	1718.08076	-442	0	150
34	0	12.15199	0	-0.100817	8.204451	-8.204451	67.3130215	-342	0	50
35	0	2.633491	0	-0.750557	3.182366	-3.182366	10.1274522	-292	0	0
36	0	0.570711	0	0.448388	2.318531	-2.318531	5.37558579	-292	0	0
37	0	0.12368	0	0.012737	1.435849	-1.435849	2.06166245	-292	0	0
38	0	0.026803	0	-1.372568	0	0	0	-292	0	0
39	0	0.005809	0	-0.163673	1.141567	-1.141567	1.30317573	-292	0	0
40	0	0.001259	0	-0.707807	0.592884	-0.592884	0.3515112	-292	0	0
	mean of the disturbance			-0.291553		-1.873471	mean of the standard errors			
	std dev of the disturbance			1.049922						

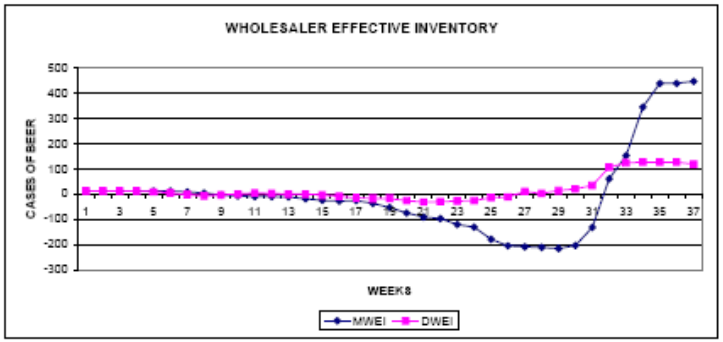
Σ (AO-Ot)2	28097.76		constraints	
θ	0.78		>=0	<=1
αs	0.13		>=0	<=1
β	0.79		>=0	<=1
S'	10.02		>=0	<=100
	GRG NonLinear			

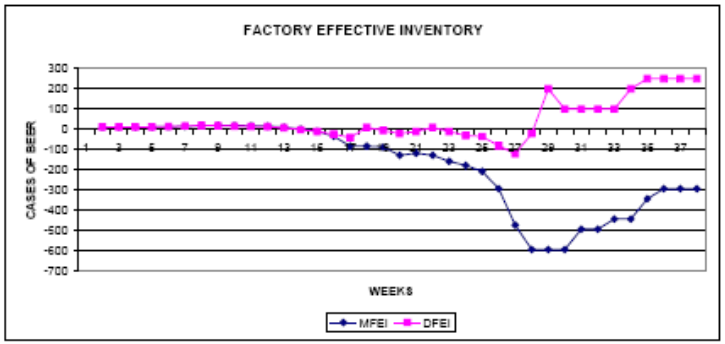
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

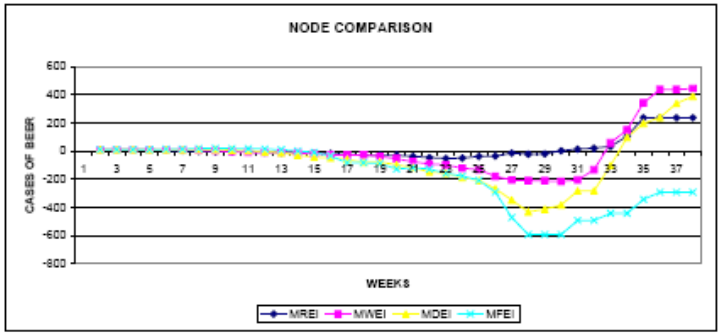
BIRA GAME MODEL WEEKS 21 TO 40 MODEL CHARTS



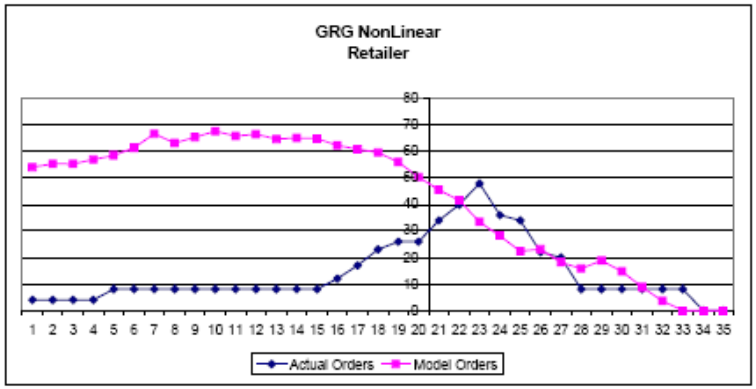


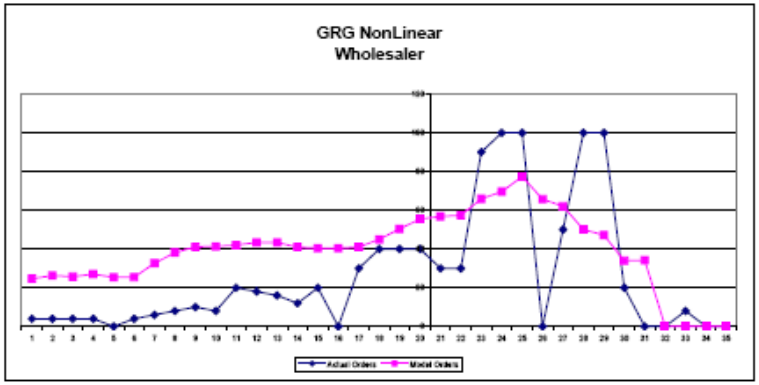


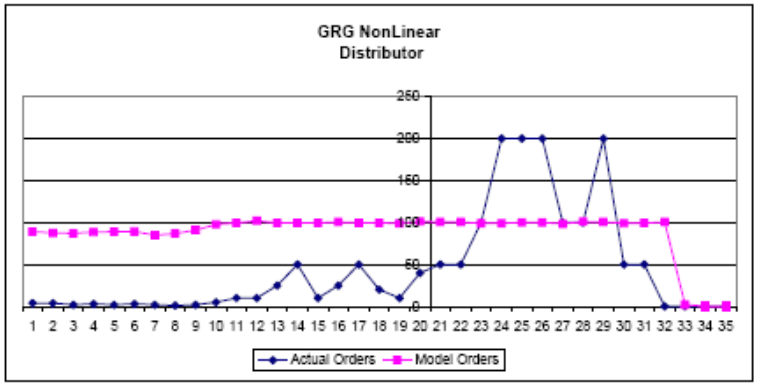


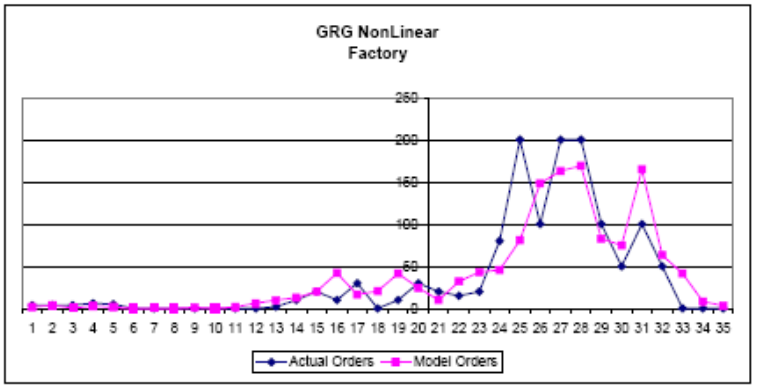


BIRA GAME MODEL WEEKS 21 TO 40 ORDER CHARTS









BIRA GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	BIRA	IT								BIRA	Retailer	IT				
	Team Costs	$ 18,020.00								Costs	$ 1,426.00					
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	4	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	4	4	12		16	4
5	8	16	4	4	0	8	8	8	*8*	28	8	4	12		16	4
6	8	12	4	4	0	8	4	4	*4*	30	8	8	16		16	4
7	8	8	4	8	0	8	0	0	*-2*	30	8	8	20		16	4
8	8	4	8	8	4	4	0	-4	*-8*	34	8	8	24		12	0
9	8	8	8	4	4	8	0	-4	*-4*	38	8	8	24		4	4
10	8	8	4	4	4	8	0	-4	*4*	42	8	8	24		4	6
11	8	4	4	6	8	4	0	-8	*1*	50	8	8	28		6	8
12	8	4	6	8	12	4	0	-12	*0*	62	8	8	32		8	6
13	8	6	8	6	14	6	0	-14	*0*	76	8	8	34		6	1
14	8	8	6	1	14	8	0	-14	*0*	90	8	8	34		1	2
15	8	6	1	2	16	6	0	-16	*-4*	106	8	8	36		2	5
16	8	1	2	5	23	1	0	-23	*-9*	129	12	8	43		5	10
17	8	2	5	10	29	2	0	-29	*-15*	158	17	12	53		10	1
18	8	5	10	1	32	5	0	-32	*-18*	190	23	17	65		1	0
19	8	10	1	0	30	10	0	-30	*-18*	220	26	23	78		0	2
20	8	1	0	2	37	1	0	-37	*-26*	257	26	26	103		2	10
21	8	0	2	10	45	0	0	-45	*-32*	302	34	26	129		10	20
22	8	2	10	20	51	2	0	-51	*-30*	353	40	34	161		20	10
23	8	10	20	10	49	10	0	-49	*-28*	402	48	40	191		10	30
24	8	20	10	30	37	20	0	-37	*-26*	439	36	48	219		30	0
25	8	10	30	0	35	10	0	-35	*-14*	474	34	36	245		0	10
26	8	30	0	10	13	30	0	-13	*-12*	487	22	34	249		10	30
27	8	0	10	30	21	0	0	-21	*10*	508	20	22	271		30	20
28	8	10	30	20	19	10	0	-19	*2*	527	8	20	281		20	15
29	8	30	20	15	0	27	3	3	*14*	528.5	8	8	259		15	20
30	8	23	15	20	0	8	15	15	*20*	536	8	8	247		20	80
31	8	30	20	80	0	8	22	22	*34*	547	8	8	240		80	200
32	8	42	80	140	0	8	34	34	*106*	564	8	8	228		200	100
33	8	114	140	8	0	8	106	106	*123*	617	8	8	156		160	200
34	8	246	8	8	0	8	238	238	*126*	736	0	8	24		352	102
35	8	246	8	8	0	8	238	238	*126*	855	0	0	16		446	0
36	8	246	8	0	0	8	238	238	*126*	974	0	0	8		438	8
37	8	246	0	0	0	8	238	238	*118*	1093	0	0	0		446	0
38	8	238	0	0	0	8	230	230	*112*	1208	0	0	0		446	0
39	8	230	0	0	0	8	222	222	*112*	1319	0	0	0		446	0
40	8	222	0	0	0	8	214	214	*94*	1426	0	0	0		446	0

BIRA GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					BIRA Costs	Wholesaler $ 3,754.00		IT								BIRA Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	4	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	4	4	12		16	4	4	0	12	12	*12*
5	4	0	12	12	*8*	30	0	4	12		16	4	2	0	12	12	*12*
6	4	0	12	12	*4*	36	4	0	8		16	2	3	0	12	12	*10*
7	0	0	8	8	*-2*	40	6	4	8		14	3	2	0	14	14	*10*
8	4	0	4	4	*-8*	42	8	6	10		17	2	3	0	13	13	*13*
9	8	4	0	-4	*-4*	46	10	8	18		15	3	2	0	9	9	*9*
10	8	8	0	-8	*0*	54	8	10	24		12	2	1	0	4	4	*4*
11	6	10	0	-10	*4*	64	20	8	26		6	1	2	4	0	-4	*-4*
12	1	10	0	-10	*2*	74	18	20	38		1	2	5	11	0	-11	*-12*
13	2	12	0	-12	*0*	86	16	18	50		2	5	10	29	0	-29	*-30*
14	5	19	0	-19	*0*	105	12	16	65		5	10	1	42	0	-42	*-73*
15	10	25	0	-25	*-4*	130	20	12	75		10	1	0	48	0	-48	*-81*
16	1	28	0	-28	*-9*	158	0	20	90		1	0	2	59	0	-59	*-93*
17	0	26	0	-26	*-15*	184	30	0	80		0	2	10	79	0	-79	*-111*
18	2	37	0	-37	*-18*	221	40	30	109		2	10	20	77	0	-77	*-121*
19	10	54	0	-54	*-18*	275	40	40	149		10	20	10	97	0	-97	*-141*
20	20	75	0	-75	*-26*	350	40	40	187		20	10	30	117	0	-117	*-161*
21	10	91	0	-91	*-32*	441	30	40	217		10	30	0	147	0	-147	*-171*
22	30	97	0	-97	*-30*	538	30	30	227		30	0	10	157	0	-157	*-201*
23	0	121	0	-121	*-28*	659	90	30	247		0	10	30	187	0	-187	*-211*
24	10	131	0	-131	*-26*	790	100	90	307		10	30	20	207	0	-207	*-241*
25	30	179	0	-179	*-14*	969	100	100	407		30	20	15	267	0	-267	*-211*
26	20	205	0	-205	*-12*	1174	0	100	497		20	15	20	347	0	-347	*-396*
27	15	209	0	-209	*10*	1383	50	0	467		15	20	80	432	0	-432	*-476*
28	20	211	0	-211	*2*	1594	100	50	497		20	80	200	412	0	-412	*-496*
29	80	216	0	-216	*14*	1810	100	100	582		80	200	100	382	0	-382	*-346*
30	200	204	0	-204	*20*	2014	20	100	662		200	100	200	282	0	-282	*-246*
31	100	132	0	-132	*34*	2146	0	20	602		100	200	200	282	0	-282	*-126*
32	200	0	60	60	*106*	2176	0	0	402		200	200	100	102	0	-102	*66*
33	102	0	152	152	*123*	2252	8	0	302		200	100	50	0	98	98	*66*
34	0	0	344	344	*126*	2424	0	8	110		198	50	100	0	198	198	*116*
35	8	0	438	438	*126*	2643	0	0	8		248	100	50	0	240	240	*166*
36	0	0	438	438	*126*	2862	0	0	8		340	50	0	0	340	340	*166*
37	0	0	446	446	*118*	3085	0	0	0		390	0	0	0	390	390	*166*
38	0	0	446	446	*112*	3308	0	0	0		390	0	0	0	390	390	*166*
39	0	0	446	446	*112*	3531	8	0	0		390	0	0	0	390	390	*166*
40	0	0	446	446	*94*	3754	0	8	8		390	0	0	0	390	390	*166*

BIRA GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									BIRA	Factory	IT		
	$ 5,041.00											Costs	$ 7,799.00			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	2	4	12		16	4	4	0	12	12	*12*	18	4	8	
4	24	3	2	10		16	4	4	0	12	12	*12*	24	6	8	
5	30	2	3	9		16	4	6	0	14	14	*14*	31	5	10	
6	36	3	2	7		18	6	5	0	15	15	*17*	38.5	0	11	
7	43	2	3	8		21	5	0	0	19	19	*20*	48	0	5	
8	49.5	1	2	7		24	0	0	0	21	21	*18*	58.5	0	0	
9	54	2	1	6		21	0	0	0	19	19	*16*	68	0	0	
10	58	5	2	5		19	0	0	0	18	18	*15*	77	0	0	
11	60	10	5	8		18	0	0	0	18	18	*13*	85	0	0	
12	71	10	10	17		16	0	0	0	11	11	*8*	90.5	0	0	
13	100	25	10	25		11	0	0	0	1	1	*-2*	91	2	0	
14	142	50	25	45		1	0	2	9	0	-9	*-10*	100	10	2	
15	190	10	50	85		0	2	10	34	0	-34	*-23*	134	20	12	
16	249	25	10	94		2	10	20	82	0	-82	*-40*	216	10	30	
17	328	50	25	119		10	20	10	82	0	-82	*10*	298	30	30	
18	405	20	50	167		20	10	30	87	0	-87	*-5*	385	0	40	
19	502	10	20	177		10	30	0	127	0	-127	*-20*	512	10	30	
20	619	40	10	167		30	0	10	117	0	-117	*-10*	629	30	10	
21	766	50	40	197		0	10	30	127	0	-127	*10*	756	20	40	
22	923	50	50	217		10	30	20	157	0	-157	*-10*	913	15	50	
23	1110	100	50	267		30	20	15	177	0	-177	*-30*	1090	20	35	
24	1317	200	100	357		20	15	20	207	0	-207	*-35*	1297	80	35	
25	1584	200	200	527		15	20	80	292	0	-292	*-80*	1589	200	100	
26	1931	200	200	707		20	80	200	472	0	-472	*-120*	2061	100	280	
27	2363	100	200	892		80	200	100	592	0	-592	*-20*	2653	200	300	
28	2775	100	100	972		200	100	200	592	0	-592	*200*	3245	200	300	
29	3157	200	100	992		100	200	200	592	0	-592	*100*	3837	100	400	
30	3439	50	200	992		200	200	100	492	0	-492	*100*	4329	50	300	
31	3721	50	50	942		200	100	50	492	0	-492	*100*	4821	100	150	
32	3823	0	50	792		100	50	100	442	0	-442	*100*	5263	50	150	
33	3872	0	0	592		50	100	50	442	0	-442	*200*	5705	0	150	
34	3971	0	0	492		100	50	0	342	0	-342	*250*	6047	0	50	
35	4091	0	0	442		50	0	0	292	0	-292	*250*	6339	0	0	
36	4261	0	0	342		0	0	0	292	0	-292	*250*	6631	0	0	
37	4456	0	0	292		0	0	0	292	0	-292	*250*	6923	0	0	
38	4651	0	0	292		0	0	0	292	0	-292	*250*	7215	0	0	
39	4846	0	0	292		0	0	0	292	0	-292	*250*	7507	0	0	
40	5041	0	0	292		0	0	0	292	0	-292	*250*	7799	0	0	

BIRA GAME MODEL WEEKS 21 TO 40 MODEL DATA

BIRA IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	4	12	4	12	2	12	4	12
4	4	12	4	12	3	12	6	12
5	8	8	0	8	2	12	5	14
6	8	4	4	4	3	10	0	17
7	8	-2	6	-2	2	10	0	20
8	8	-8	8	-8	1	13	0	18
9	8	-4	10	-4	2	9	0	16
10	8	4	8	0	5	4	0	15
11	8	1	20	4	10	-4	0	13
12	8	0	18	2	10	-12	0	8
13	8	0	16	0	25	-30	2	-2
14	8	0	12	0	50	-73	10	-10
15	8	-4	20	-4	10	-81	20	-23
16	12	-9	0	-9	25	-93	10	-40
17	17	-15	30	-15	50	-111	30	10
18	23	-18	40	-18	20	-121	0	-5
19	26	-18	40	-18	10	-141	10	-20
20	26	-26	40	-26	40	-161	30	-10
21	34	-32	30	-32	50	-171	20	10
22	40	-30	30	-30	50	-201	15	-10
23	48	-28	90	-28	100	-211	20	-30
24	36	-26	100	-26	200	-241	80	-35
25	34	-14	100	-14	200	-211	200	-80
26	22	-12	0	-12	200	-396	100	-120
27	20	10	50	10	100	-476	200	-20
28	8	2	100	2	100	-496	200	200
29	8	14	100	14	200	-346	100	100
30	8	20	20	20	50	-246	50	100
31	8	34	0	34	50	-126	100	100
32	8	106	0	106	0	66	50	100
33	8	123	8	123	0	66	0	200
34	0	126	0	126	0	116	0	250
35	0	126	0	126	0	166	0	250
36	0	126	0	126	0	166	0	250
37	0	118	0	118	0	166	0	250
38	0	112	0	112	0	166	0	250
39	0	112	8	112	0	166	0	250
40	0	94	0	94	0	166	0	250

BLACK LABEL GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.376719	2.834097	1.1659034	1.35933077	12	12	12
2	4	0.00	4	-1.305074	1.152304	2.847696	8.10937229	12	12	12
3	4	0.00	4	-0.899828	1.55755	2.4424504	5.96556402	12	12	12
4	4	0.00	4	1.065121	3.522498	0.4775017	0.22800789	12	12	12
5	8	0.00	10	0.591762	7.049139	2.9508605	8.70757777	8	8	12
6	8	0.00	14	0.283143	9.596087	4.4039127	19.3944468	4	4	18
7	8	0.00	8	1.236898	12.64245	-4.642454	21.5523756	0	0	28
8	8	0.00	8	-0.033802	10.6088	-2.608798	6.8058262	-4	0	32
9	8	0.00	8	-0.389669	10.63441	-2.634409	6.94010991	-2	0	30
10	8	0.00	6	0.530193	11.74501	-5.745009	33.0051311	-1	0	29
11	8	0.00	6	-0.408072	10.23453	-4.234528	17.931225	-6	0	32
12	8	0.00	8	-0.958922	10.44863	-2.448634	5.99801662	-4	0	28
13	8	0.00	8	0.026466	12.19498	-4.194977	17.5978302	0	0	24
14	8	0.00	8	-0.228099	11.13115	-3.131151	9.80410707	1	1	23
15	8	0.00	8	1.272978	13.44149	-5.441489	29.6098041	0	0	24
16	8	0.00	10	1.260965	13.42948	-3.429478	11.7613035	0	0	24
17	8	0.00	8	1.196162	12.9832	-4.983195	24.8322349	0	0	26
18	8	0.00	6	0.266216	12.05325	-6.053249	36.6418273	0	0	26
19	8	0.00	8	-4.106694	7.871078	0.1289223	0.01662096	-1	0	25
20	8	0.00	6	1.143755	12.54931	-6.54931	42.8934655	-4	0	28
21	8	0.00	10	0.251206	11.8475	-1.8475	3.41325522	-5	0	27
22	8	0.00	17	-0.886572	9.565289	7.4347108	55.2749251	-9	0	33
23	8	0.00	8	0.849607	9.583818	-1.583818	2.50847907	-9	0	42
24	8	0.00	10	-0.554089	8.562599	1.4374005	2.06612023	-7	0	40
25	8	0.00	10	-0.565324	8.551365	1.4486355	2.09854469	-5	0	40
26	8	0.00	6	0.165968	9.282657	-3.282657	10.7758355	-3	0	40
27	8	0.00	18	2.098099	10.45183	7.548168	56.9748404	-9	0	44
28	8	0.00	6	1.3938	7.267927	-1.267927	1.60763851	-12	0	57
29	8	0.00	8	-0.363321	6.273762	1.7262384	2.97999893	-10	0	53
30	8	0.00	6	-0.288999	8.255472	-2.255472	5.08715539	0	0	43
31	8	0.00	2	0.356552	7.663979	-5.663979	32.0806581	2	2	39
32	8	0.00	0	-0.251707	4.963109	-4.963109	24.6324554	6	6	29
33	8	0.00	0	-0.289088	2.425334	-2.425334	5.88224531	11	11	16
34	8	0.00	6	-0.152597	4.067736	1.9322639	3.73364389	11	11	8
35	8	0.00	8	-0.412574	5.807759	2.1922406	4.80591886	9	9	8
36	9	0.00	10	-0.934111	10.14179	-0.141789	0.02010404	3	3	14
37	10	0.00	8	-0.2067	11.96181	-3.961811	15.6959427	-5	0	24
38	11	0.00	16	0.251206	12.03824	3.9617614	15.6955532	-7	0	26
39	12	0.00	6	-0.886572	7.848639	-1.848639	3.41746844	-15	0	42
40	13	0.00	10	0.849607	8.439384	1.5606155	2.4356208	-23	0	48
	mean of the disturbance			0.065434		-1.178502	mean of the standard errors			
	std dev of the disturbance			1.075091						

			constraints		
Σ (AO-Ot)2	251.1882				
θ	0.00		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.19		>=0	<=1	
S'	16.75		>=0	<=100	INT

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

BLACK LABEL GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0	4	-1.091303	0	4	16	12	12	12
2	4	0	4	0.797015	0	4	16	12	12	12
3	4	0	4	1.066347	0	4	16	12	12	12
4	4	0	3	0.501041	0	3	9	12	12	12
5	4	0	3	-0.566319	0	3	9	12	12	11
6	10	0	10	1.190883	0	10	100	12	12	10
7	14	0	12	-0.484102	2.543917	9.456083	89.4175059	6	6	16
8	8	0	9	0.167606	8.754772	0.2452284	0.06013695	-5	0	25
9	8	0	14	-0.357325	8.229941	5.7700588	33.2935787	-10	0	31
10	8	0	12	0.758508	9.345774	2.654226	7.04491587	-8	0	35
11	6	0	6	0.412998	9.000264	-3.000264	9.00158298	-4	0	35
12	6	0	3	-1.127522	7.459744	-4.459744	19.8893132	-1	0	32
13	8	0	3	-1.834573	3.046528	-0.046528	0.00216484	4	4	24
14	8	0	5	-1.106452	1.921567	3.0784331	9.47675035	6	6	17
15	8	0	7	0.650363	1.8253	5.1747001	26.7775216	8	8	12
16	8	0	4	-0.197064	4.684037	-0.684037	0.46790661	4	4	15
17	10	0	8	-0.712916	7.87435	0.12565	0.01578793	-1	0	16
18	8	0	10	0.520949	9.108215	0.8917852	0.79528092	-6	0	19
19	6	0	10	1.369252	9.956518	0.043482	0.00189088	-7	0	22
20	8	0	10	-0.890703	7.696563	2.3034372	5.30582315	-9	0	28
21	6	0	6	0.969787	9.557054	-3.557054	12.65263	-9	0	30
22	10	0	10	-2.448239	6.139027	3.8609726	14.9071091	-5	0	26
23	17	0	20	0.70238	9.289646	10.710354	114.711688	-5	0	26
24	8	0	10	-0.197956	8.38931	1.6106896	2.5943211	-12	0	36
25	10	0	12	-0.049477	8.537789	3.4622106	11.9869019	-18	0	44
26	10	0	8	-1.475086	7.11218	0.8878202	0.78822473	-23	0	51
27	6	0	4	1.659752	10.24702	-6.247018	39.0252391	-23	0	49
28	18	0	8	-1.308431	7.278835	0.7211647	0.52007852	-11	0	35
29	6	0	6	0.610414	9.19768	-3.19768	10.2251603	-19	0	33
30	8	0	6	-1.949658	6.637608	-0.637608	0.40654371	-13	0	27
31	6	0	2	0.92341	9.510676	-7.510676	56.4102529	-8	0	20
32	2	0	0	-0.355112	8.232154	-8.232154	67.7683651	-6	0	14
33	0	0	0	-0.333582	8.253684	-8.253684	68.1233045	-2	0	8
34	0	0	0	-0.16186	4.719241	-4.719241	22.2712374	4	4	2
35	6	0	6	-0.209792	2.818227	3.1817732	10.1236806	6	6	0
36	8	0	6	-0.05527	8.531997	-2.531997	6.41100643	0	0	6
37	10	0	12	0.908018	9.495284	2.5047159	6.27360199	-8	0	12
38	8	0	20	-1.391119	7.196147	12.803853	163.938642	-18	0	24
39	16	0	16	0.643825	9.231091	6.7689091	45.8181307	-20	0	38
40	6	0	8	1.032993	9.620259	-1.620259	2.62524076	-30	0	48
	mean of the disturbance			-0.130196		0.9037823	mean of the standard errors			
	std dev of the disturbance			1.010428						

Σ (AO-Ot)2	657.5814		constraints		
θ	0.00		>=0	<=1	
αs	0.93		>=0	<=1	
β	0.00		>=0	<=1	
S'	9.27		>=0	<=100	INT

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

BLACK LABEL GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	3.576498	4	0.452761	7.991951	-3.991951	15.935672	12	12	12
2	4	3.955161	4	-0.413612	7.504242	-3.504242	12.2797144	12	12	12
3	4	3.995253	8	1.242415	9.200361	-3.200361	10.2423076	12	12	12
4	4	3.999497	8	-1.04082	8.700479	-0.700479	0.4906708	12	12	14
5	3	3.999947	8	0.39542	7.916278	0.0837224	0.00700943	12	12	16
6	3	3.10587	8	0.915993	6.872306	1.1276941	1.2716939	13	13	20
7	10	3.011209	4	-0.366577	4.588122	-0.588122	0.3458874	16	16	22
8	12	9.260058	10	-1.174382	11.16481	-1.164806	1.3567736	12	12	20
9	9	11.70991	10	0.564567	16.04746	-6.047463	36.5718093	8	8	22
10	14	9.286913	15	0.486914	13.55461	1.4453874	2.0891446	7	7	24
11	12	13.501	15	-1.780744	15.98695	-0.986954	0.78668653	-3	0	35
12	6	12.15892	6	0.521915	16.29531	-10.29531	105.993332	-5	0	40
13	3	6.652079	4	-0.45982	10.24851	-6.248512	39.0439066	-1	0	36
14	3	3.386666	8	-0.951447	5.545536	2.4544637	6.02439222	8	8	28
15	5	3.040938	6	1.422295	6.19363	-0.19363	0.03749239	15	15	26
16	7	4.792583	2	-0.872986	4.948338	-2.948338	8.69269544	20	20	22
17	4	6.766289	5	-0.97078	7.258234	-2.258234	5.09962018	21	21	16
18	8	4.292882	0	0.422666	5.59486	-5.59486	31.3024584	25	25	13
19	10	7.607507	2	-0.068001	9.538864	-7.538864	56.8344682	23	23	7
20	10	9.746694	5	-1.04082	12.53473	-7.53473	56.7721591	15	15	7
21	10	9.973181	10	0.55302	15.49849	-5.498495	30.233443	10	10	7
22	6	9.997161	20	0.20519	16.35706	3.6429359	13.2709821	0	0	17
23	10	6.423202	10	-0.631205	9.958695	0.0413053	0.00170613	-4	0	35
24	20	9.621305	10	-0.326345	12.90943	-2.909432	8.4647937	-9	0	40
25	10	18.90115	30	-1.11591	21.39971	8.6002876	73.9649471	-19	0	40
26	12	10.94241	15	0.313845	13.54539	1.4546126	2.11589787	-11	0	52
27	8	11.88803	10	-0.31668	13.30825	-3.30825	10.9445158	-13	0	57
28	4	8.411647	8	-0.52714	9.842299	-1.842299	3.39406625	-9	0	55
29	8	4.467085	8	0.025154	6.411048	1.5889519	2.52476806	5	5	45
30	6	7.625951	6	-1.101958	7.023897	-1.023897	1.04836528	17	17	33
31	6	6.172148	6	-1.03576	4.572115	1.4278855	2.03885688	26	26	24
32	2	6.018226	2	1.718788	6.699772	-4.699772	22.0878577	30	30	20
33	0	2.425432	6	0.43561	1.114348	4.885652	23.8695956	36	36	14
34	0	0.256794	6	0.023216	0	6	36	42	42	14
35	0	0.027188	0	-1.333399	0	0	0	48	48	14
36	6	0.002879	0	-0.34163	0	0	0	50	50	12
37	6	5.365052	0	0.806367	2.697874	-2.697874	7.27852555	45	45	11
38	12	5.932774	8	-0.358384	3.472971	4.5270295	20.4939958	39	39	11
39	20	11.35763	10	0.55302	11.66991	-1.669915	2.78861539	27	27	19
40	16	19.08498	20	0.20519	22.51873	-2.518733	6.34401668	7	7	29
	mean of the disturbance			-0.166532		-1.40646	mean of the standard errors			
	std dev of the disturbance			0.847769						

Σ (AO-Ot)2	266.8649		constraints		
θ	0.89		>=0	<=1	
αs	0.23		>=0	<=1	
β	0.48		>=0	<=1	
S'	35.12		>=0	<=100	INT
	GRG NonLinear				

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

BLACK LABEL GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0	4	1.587136	9.332426	-5.332426	28.4347699	12	12	8
2	4	0	4	0.267575	8.012865	-4.012865	16.1030883	12	12	8
3	4	0	6	-1.288142	6.457148	-0.457148	0.20898425	12	12	8
4	6	0	4	-0.088588	7.656702	-3.656702	13.3714701	12	12	10
5	6	0	6	-0.66309	7.25823	-1.25823	1.58314178	10	10	10
6	8	0	6	-0.495152	7.426167	-1.426167	2.03395358	10	10	10
7	8	0	10	1.895538	10.16892	-0.168916	0.02853249	6	6	12
8	4	0	10	1.587136	10.03654	-0.036544	0.00133543	4	4	16
9	10	0	6	0.267575	8.540953	-2.540953	6.45644369	6	6	20
10	10	0	10	-1.288142	6.985236	3.0147641	9.08880252	6	6	16
11	15	0	10	-0.088588	8.18479	1.81521	3.29498723	6	6	16
12	15	0	16	-0.66309	8.138376	7.8616238	61.8051287	-3	0	20
13	6	0	16	-0.495152	8.306314	7.693686	59.1928038	-8	0	26
14	4	0	10	1.895538	10.697	-0.697004	0.48581401	-4	0	32
15	8	0	4	1.587136	9.684485	-5.684485	32.3133686	8	8	26
16	6	0	6	0.416417	7.809649	-1.809649	3.27482856	16	16	14
17	2	0	4	1.189166	8.230339	-4.230339	17.8957643	20	20	10
18	5	0	0	1.436887	8.30203	-8.30203	68.9237087	22	22	10
19	0	0	0	0.260367	7.037495	-7.037495	49.5263392	23	23	4
20	2	0	4	0.426998	6.852068	-2.852068	8.13429082	27	27	0
21	5	0	4	0.476753	7.077852	-3.077852	9.47317424	25	25	4
22	10	0	10	-0.56076	6.480413	3.5195873	12.3874945	20	20	8
23	20	0	20	1.580623	9.149884	10.850116	117.725022	14	14	14
24	10	0	10	-0.332674	8.468792	1.5312085	2.34459933	-2	0	30
25	10	0	20	1.181735	9.983201	10.016799	100.336259	-2	0	30
26	30	0	15	-0.307298	7.79005	7.2099497	51.9833746	8	8	30
27	15	0	15	-0.170089	8.631376	6.3686235	40.5593656	-12	0	35
28	10	0	7	-0.01572	8.785746	-1.785746	3.18888988	-7	0	30
29	8	0	8	-0.566487	8.234979	-0.234979	0.05521499	-2	0	22
30	8	0	0	-0.156897	8.204496	-8.204496	67.3137485	5	5	15
31	6	0	3	-0.276366	8.173041	-5.173041	26.7603541	4	4	8
32	6	0	0	1.797772	10.07115	-10.07115	101.428063	6	6	3
33	2	0	0	-0.425491	8.375975	-8.375975	70.1569494	0	0	3
34	6	0	0	-0.190709	8.522743	-8.522743	72.6371419	1	1	0
35	6	0	0	-0.509169	8.292297	-8.292297	68.7621814	-5	0	0
36	0	0	0	-1.40837	7.393096	-7.393096	54.6578718	-11	0	0
37	0	0	10	0.013567	8.815033	1.1849675	1.40414791	-11	0	0
38	0	0	8	1.344304	10.14577	-2.14577	4.60432808	-11	0	10
39	8	0	20	0.338135	9.139601	10.860399	117.948265	-11	0	18
40	10	0	20	-1.260583	7.540883	12.459117	155.229598	-9	0	28
	mean of the disturbance			0.264936		-1.238849	mean of the standard errors			
	std dev of the disturbance			0.936788						

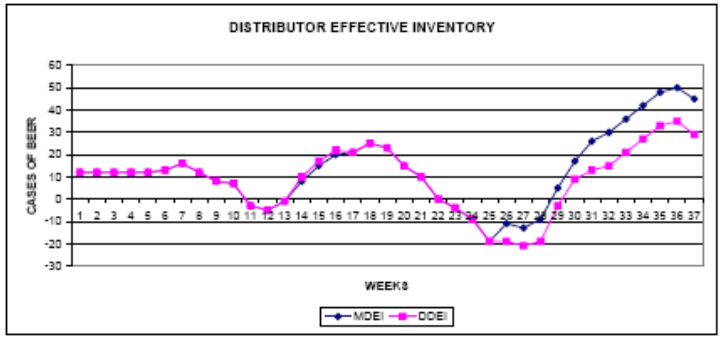
Σ (AO-Ot)2	1078.956		constraints		
θ	0.00		>=0	<=1	
αs	0.09		>=0	<=1	
β	0.00		>=0	<=1	
S'	100.00		>=0	<=100	INT

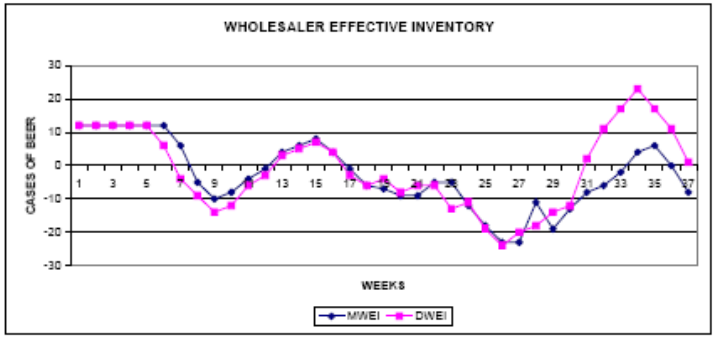
GRG NonLinear

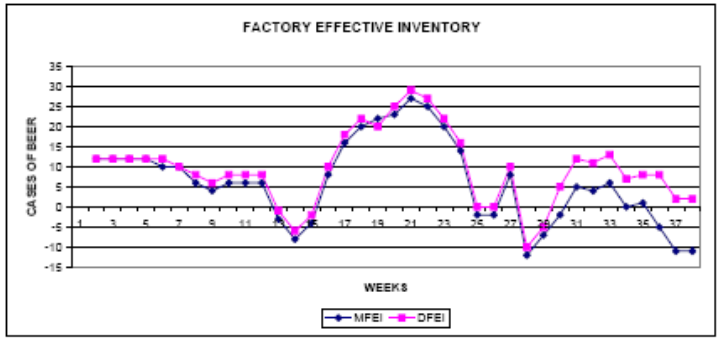
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)*eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0,eIO+\alpha s(s'-S_t-\beta SL_t)+\varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

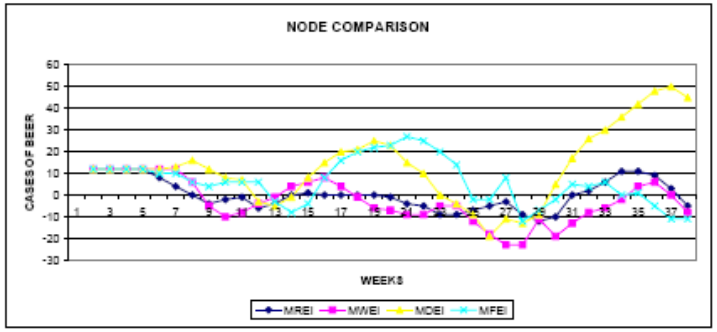
BLACK LABEL GAME MODEL WEEKS 21 TO 40

MODEL CHARTS

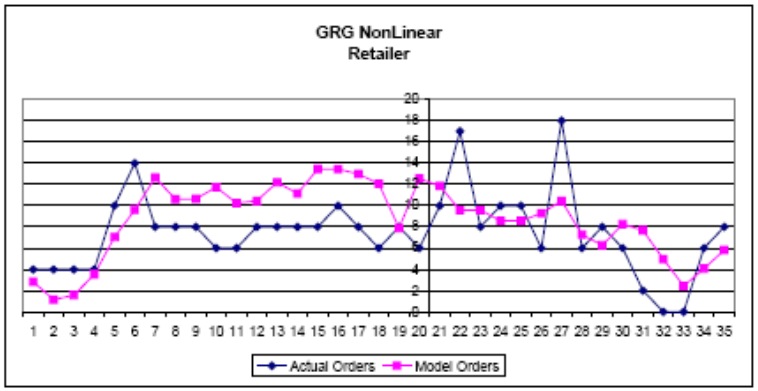


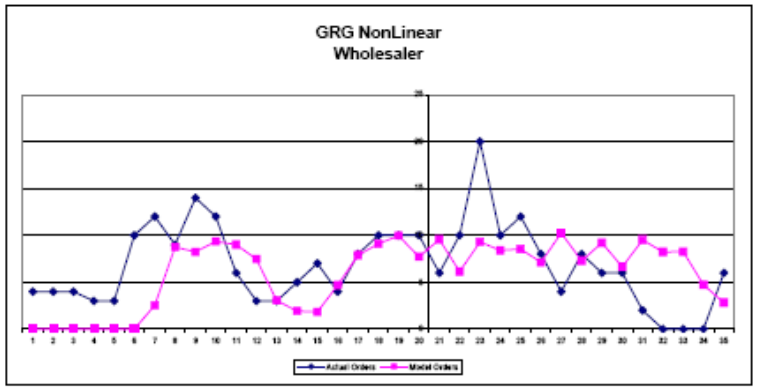


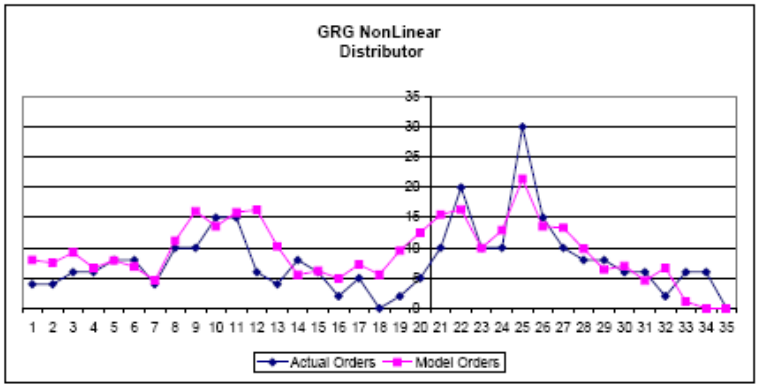


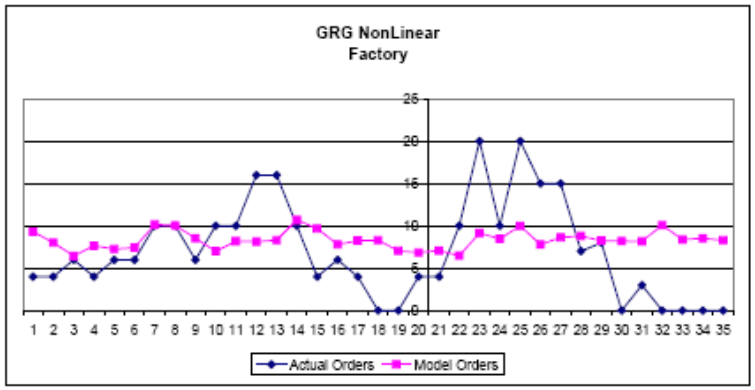


BLACK LABEL GAME MODEL WEEKS 21 TO 40 ORDER CHARTS









BLACK LABEL GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	BLACK LABEL	IT							BLACK LABEL	Retailer	IT					
	Team Costs	$ 1,160.50							Costs	$ 192.50						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	4	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	4	4	12		16	4
5	8	16	4	4	0	8	8	8	*8*	28	10	4	12		16	4
6	8	12	4	4	0	8	4	4	*4*	30	14	10	18		16	4
7	8	8	4	10	0	8	0	0	*0*	30	8	14	28		16	3
8	8	4	10	9	4	4	0	-4	*2*	34	8	8	32		9	3
9	8	10	9	3	2	10	0	-2	*4*	36	8	8	30		3	10
10	8	9	3	10	1	9	0	-1	*-1*	37	6	8	29		10	12
11	8	3	10	12	6	3	0	-6	*-6*	43	6	6	32		12	9
12	8	10	12	9	4	10	0	-4	*-4*	47	8	6	28		9	11
13	8	12	9	7	0	12	0	0	*0*	47	8	8	24		11	10
14	8	9	7	8	0	8	1	1	*1*	47.5	8	8	23		14	10
15	8	8	8	8	0	8	0	0	*1*	47.5	8	8	24		16	4
16	8	8	8	8	0	8	0	0	*1*	47.5	10	8	24		12	3
17	8	8	8	7	0	8	0	0	*1*	47.5	8	10	26		7	5
18	8	8	7	5	0	8	0	0	*0*	47.5	6	8	26		5	7
19	8	7	5	7	1	7	0	-1	*-1*	48.5	8	6	25		7	4
20	8	5	7	4	4	5	0	-4	*-4*	52.5	6	8	28		4	8
21	8	7	4	8	5	7	0	-5	*-5*	57.5	10	6	27		8	10
22	8	4	8	10	9	4	0	-9	*-9*	66.5	17	10	33		10	10
23	8	8	10	10	9	8	0	-9	*-9*	75.5	8	17	42		10	10
24	8	10	10	10	7	10	0	-7	*-7*	82.5	10	8	40		10	2
25	8	10	10	2	5	10	0	-5	*-5*	87.5	10	10	40		2	5
26	8	10	2	5	3	10	0	-3	*-3*	90.5	6	10	40		5	10
27	8	2	5	10	9	2	0	-9	*-9*	99.5	18	6	44		10	18
28	8	5	10	18	12	5	0	-12	*-12*	111.5	6	18	57		18	10
29	8	10	18	10	10	10	0	-10	*-10*	121.5	8	6	53		10	12
30	8	18	10	12	0	18	0	0	*2*	121.5	6	8	43		12	13
31	8	10	12	13	0	8	2	2	*4*	122.5	2	6	39		13	8
32	8	14	13	8	0	8	6	6	*6*	125.5	0	2	29		8	6
33	8	19	8	6	0	8	11	11	*16*	131	0	0	16		6	6
34	8	19	6	2	0	8	11	11	*10*	136.5	6	0	8		6	2
35	8	17	2	0	0	8	9	9	*2*	141	8	6	8		6	0
36	8	11	0	6	0	8	3	3	*-6*	142.5	10	8	14		6	0
37	8	3	6	0	5	3	0	-5	*-8*	147.5	8	10	24		0	0
38	8	6	0	0	7	6	0	-7	*-8*	154.5	16	8	26		0	6
39	8	0	0	6	15	0	0	-15	*-6*	169.5	6	16	42		6	6
40	8	0	6	6	23	0	0	-23	*-13*	192.5	10	6	48		6	12

BLACK LABEL GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

	STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews						
					BLACK LABEL	Wholesaler		IT									BLACK LABEL
					Costs	$ 336.00											Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	4	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	3	4	12		16	4	4	0	12	12	*12*
5	4	0	12	12	*12*	30	3	3	11		16	4	6	0	12	12	*12*
6	3	0	12	12	*6*	36	10	3	10		16	6	6	0	13	13	*13*
7	3	0	6	6	*-4*	39	12	10	16		19	6	8	0	16	16	*16*
8	10	5	0	-5	*-9*	44	9	12	25		22	8	8	0	12	12	*12*
9	12	10	0	-10	*-14*	54	14	9	31		20	8	4	0	8	8	*8*
10	9	8	0	-8	*-12*	62	12	14	35		16	4	10	0	7	7	*7*
11	11	4	0	-4	*-6*	66	6	12	35		11	10	10	3	0	-3	*-3*
12	10	1	0	-1	*-3*	67	3	6	32		10	10	12	5	0	-5	*-5*
13	10	0	4	4	*3*	69	3	3	24		10	12	10	1	0	-1	*-1*
14	4	0	6	6	*5*	72	5	3	17		12	10	10	0	8	8	*10*
15	3	0	8	8	*7*	76	7	5	12		18	10	8	0	15	15	*17*
16	5	0	4	4	*4*	78	4	7	15		25	8	8	0	20	20	*22*
17	7	1	0	-1	*-3*	79	8	4	16		28	8	6	0	21	21	*21*
18	4	6	0	-6	*-6*	85	10	8	19		29	6	2	0	25	25	*25*
19	8	7	0	-7	*-4*	92	10	10	22		31	2	5	0	23	23	*23*
20	10	9	0	-9	*-8*	101	10	10	28		25	5	0	0	15	15	*15*
21	10	9	0	-9	*-6*	110	6	10	30		20	0	2	0	10	10	*10*
22	10	5	0	-5	*-6*	115	10	6	26		10	2	5	0	0	0	*0*
23	2	5	0	-5	*-13*	120	20	10	26		2	5	10	4	0	-4	*-4*
24	5	12	0	-12	*-11*	132	10	20	36		5	10	18	9	0	-9	*-9*
25	10	18	0	-18	*-19*	150	12	10	44		10	18	10	19	0	-19	*-19*
26	18	23	0	-23	*-24*	173	8	12	51		18	10	12	11	0	-11	*-19*
27	10	23	0	-23	*-20*	196	4	8	49		10	12	18	13	0	-13	*-21*
28	12	11	0	-11	*-18*	207	8	4	35		12	18	20	9	0	-9	*-19*
29	13	19	0	-19	*-14*	226	6	8	33		18	20	15	0	5	5	*-3*
30	8	13	0	-13	*-12*	239	6	6	27		25	15	10	0	17	17	*9*
31	6	8	0	-8	*2*	247	2	6	20		32	10	8	0	26	26	*13*
32	6	6	0	-6	*11*	253	0	2	14		36	8	6	0	30	30	*15*
33	2	2	0	-2	*17*	255	0	0	8		38	6	6	0	36	36	*21*
34	0	0	4	4	*23*	257	0	0	2		42	6	2	0	42	42	*27*
35	0	0	6	6	*17*	260	6	0	0		48	2	1	0	48	48	*33*
36	0	0	0	0	*11*	260	6	6	6		50	1	0	0	50	50	*35*
37	6	8	0	-8	*1*	268	12	6	12		51	0	0	0	45	45	*29*
38	6	18	0	-18	*-7*	286	20	12	24		45	0	0	0	39	39	*26*
39	12	20	0	-20	*-17*	306	16	20	36		39	0	0	0	27	27	*17*
40	20	30	0	-30	*-17*	336	8	16	48		27	0	10	0	7	7	*-3*

BLACK LABEL GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT								BLACK LABEL		Factory	IT		
	$ 386.50											Costs	$ 245.50			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	6	4	12		16	4	4	0	12	12	*12*	18	6	8	
4	24	6	6	14		16	4	6	0	12	12	*12*	24	4	10	
5	30	8	6	16		16	6	4	0	10	10	*12*	29	6	10	
6	36.5	8	8	20		16	4	6	0	10	10	*10*	34	6	10	
7	44.5	4	8	22		14	6	6	0	8	8	*8*	37	10	12	
8	50.5	10	4	20		12	6	10	0	4	4	*6*	39	10	16	
9	54.5	10	10	22		10	10	10	0	6	6	*8*	42	6	20	
10	58	15	10	24		16	10	6	0	6	6	*8*	45	10	16	
11	61	15	15	35		16	6	10	0	6	6	*8*	48	10	16	
12	66	6	15	40		12	10	10	3	0	-3	*-1*	51	16	20	
13	67	4	6	36		10	10	16	8	0	-8	*-6*	59	16	26	
14	71	8	4	28		10	16	16	4	0	-4	*-2*	63	10	32	
15	79.5	6	8	26		16	16	10	0	8	8	*10*	67	4	26	
16	88.5	2	6	22		24	10	4	0	16	16	*18*	75	6	14	
17	99	5	2	16		26	4	6	0	20	20	*22*	85	4	10	
18	111.5	0	5	13		24	6	4	0	22	22	*20*	96	0	10	
19	123	2	0	7		28	4	0	0	23	23	*25*	107.5	0	4	
20	130.5	5	2	7		27	0	0	0	27	27	*29*	121	4	0	
21	135.5	10	5	7		27	0	4	0	25	25	*27*	133.5	4	4	
22	135.5	20	10	17		25	4	4	0	20	20	*22*	143.5	10	8	
23	139.5	10	20	35		24	4	10	0	14	14	*16*	150.5	20	14	
24	148.5	10	10	40		18	10	20	2	0	-2	*0*	152.5	10	30	
25	167.5	30	10	40		10	20	10	2	0	-2	*0*	154.5	20	30	
26	178.5	15	30	52		20	10	20	0	8	8	*10*	158.5	15	30	
27	191.5	10	15	57		18	20	15	12	0	-12	*-10*	170.5	15	35	
28	200.5	8	10	55		20	15	15	7	0	-7	*-5*	177.5	7	30	
29	203	8	8	45		15	15	7	2	0	-2	*5*	179.5	8	22	
30	211.5	6	8	33		15	7	8	0	5	5	*12*	182	0	15	
31	224.5	6	6	24		12	8	0	0	4	4	*11*	184	3	8	
32	239.5	2	6	20		12	0	3	0	6	6	*13*	187	0	3	
33	257.5	6	2	14		6	3	0	0	0	0	*7*	187	0	3	
34	278.5	6	6	14		3	0	0	0	1	1	*8*	187.5	0	0	
35	302.5	0	6	14		1	0	0	5	0	-5	*8*	192.5	0	0	
36	327.5	0	0	12		0	0	0	11	0	-11	*2*	203.5	0	0	
37	350	0	0	11		0	0	0	11	0	-11	*2*	214.5	10	0	
38	369.5	8	0	11		0	0	10	11	0	-11	*2*	225.5	8	10	
39	383	10	8	19		0	10	8	11	0	-11	*2*	236.5	20	18	
40	386.5	20	10	29		10	8	20	9	0	-9	*4*	245.5	20	28	

BLACK LABEL GAME MODEL WEEKS 21 TO 40 MODEL DATA

BLACK LABEL IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	4	12	4	12	6	12	6	12
4	4	12	3	12	6	12	4	12
5	10	8	3	12	8	12	6	12
6	14	4	10	6	8	13	6	10
7	8	0	12	-4	4	16	10	8
8	8	2	9	-9	10	12	10	6
9	8	4	14	-14	10	8	6	8
10	6	-1	12	-12	15	7	10	8
11	6	-6	6	-6	15	-3	10	8
12	8	-4	3	-3	6	-5	16	-1
13	8	0	3	3	4	-1	16	-6
14	8	1	5	5	8	10	10	-2
15	8	1	7	7	6	17	4	10
16	10	1	4	4	2	22	6	18
17	8	1	8	-3	5	21	4	22
18	6	0	10	-6	0	25	0	20
19	8	-1	10	-4	2	23	0	25
20	6	-4	10	-8	5	15	4	29
21	10	-5	6	-6	10	10	4	27
22	17	-9	10	-6	20	0	10	22
23	8	-9	20	-13	10	-4	20	16
24	10	-7	10	-11	10	-9	10	0
25	10	-5	12	-19	30	-19	20	0
26	6	-3	8	-24	15	-19	15	10
27	18	-9	4	-20	10	-21	15	-10
28	6	-12	8	-18	8	-19	7	-5
29	8	-10	6	-14	8	-3	8	5
30	6	2	6	-12	6	9	0	12
31	2	4	2	2	6	13	3	11
32	0	6	0	11	2	15	0	13
33	0	16	0	17	6	21	0	7
34	6	10	0	23	6	27	0	8
35	8	2	6	17	0	33	0	8
36	10	-6	6	11	0	35	0	2
37	8	-8	12	1	0	29	10	2
38	16	-8	20	-7	8	26	8	2
39	6	-6	16	-17	10	17	20	2
40	10	-13	8	-17	20	-3	20	4

FROSTY GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	-0.468396	4.493759	-0.493759	0.24379749	12	12	12
2	4	0.02	4	0.361167	5.339544	-1.339544	1.79437836	12	12	12
3	4	0.03	4	-0.478603	4.515932	-0.515932	0.26618569	12	12	12
4	4	0.05	6	-0.271711	4.738915	1.2610852	1.59033576	12	12	12
5	8	0.06	10	-0.538842	6.087338	3.9126623	15.3089261	8	8	14
6	8	0.10	10	0.544599	9.477774	1.5222256	2.31717075	4	4	20
7	8	0.13	10	-0.751178	9.488861	1.5111387	2.28354012	0	0	26
8	8	0.16	10	1.576229	10.52347	-0.523475	0.27402606	-2	0	30
9	8	0.19	8	-0.516852	8.462188	-0.462188	0.21361745	0	0	30
10	8	0.22	8	-0.198189	8.093932	-0.093932	0.00882313	2	2	28
11	8	0.26	8	0.651138	8.25621	-0.25621	0.06564352	4	4	26
12	8	0.29	8	-0.436679	8.27768	-0.27768	0.07710591	1	1	29
13	8	0.32	8	0.100057	8.880272	-0.880272	0.7748791	-4	0	34
14	8	0.35	8	-1.475634	6.929839	1.070161	1.14524449	-9	0	39
15	8	0.38	8	0.869332	9.955267	-1.955267	3.82306974	-1	0	31
16	8	0.41	8	-0.662673	7.967089	0.0329111	0.00108314	-7	0	37
17	8	0.44	8	0.725364	9.061186	-1.061186	1.12611679	-11	0	41
18	8	0.47	8	-0.480296	8.419857	-0.419857	0.17628024	1	1	29
19	8	0.50	8	-0.468396	6.665824	1.3341765	1.78002692	6	6	24
20	8	0.53	8	0.361167	7.52579	0.4742097	0.22487496	6	6	24
21	8	0.56	8	0.910826	8.10573	-0.10573	0.01117894	6	6	24
22	8	0.59	8	-0.187825	7.037237	0.9627627	0.92691203	6	6	24
23	8	0.62	8	-1.086213	6.188885	1.8311152	3.3529828	6	6	24
24	8	0.65	7	0.339506	7.624518	-0.624518	0.39002241	6	6	24
25	8	0.68	7	-1.680659	5.715324	1.2846761	1.65039258	6	6	23
26	8	0.71	8	0.763821	8.270665	-0.270665	0.07325419	6	6	22
27	8	0.74	7	-0.22	7.316386	-0.316386	0.10009999	6	6	22
28	8	0.77	7	0.910826	8.917114	-1.917114	3.67532672	5	5	22
29	8	0.80	7	-0.187825	8.288247	-1.288247	1.65958071	4	4	22
30	8	0.83	8	-1.086213	7.500232	0.4997685	0.24976855	4	4	21
31	8	0.86	8	0.339506	9.314318	-1.314318	1.72743121	3	3	22
32	8	0.89	8	-1.680659	7.682402	0.3175985	0.10086881	2	2	23
33	8	0.92	8	0.763821	10.51501	-2.515014	6.32529334	1	1	24
34	8	0.95	8	-0.22	9.559915	-1.559915	2.43333629	1	1	24
35	8	0.98	8	0.910826	10.71935	-2.719347	7.39484697	1	1	24
36	9	1.00	16	-0.187825	9.649186	6.3508139	40.3328373	1	1	24
37	10	1.04	12	-1.086213	8.006011	3.9939887	15.9519461	-6	0	39
38	11	1.07	8	1.531422	9.767029	-1.767029	3.12239053	-13	0	50
39	12	1.11	8	0.624892	9.06312	-1.06312	1.13022366	-11	0	48
40	13	1.16	8	-1.257425	7.793212	0.2067877	0.04276116	-4	0	41
	mean of the disturbance			-0.084819		-0.139887	mean of the standard errors			
	std dev of the disturbance			0.795377						

		constraints	
Σ (AO-Ot)2	90.65145		
θ	0.00	>=0	<=1
αs	0.44	>=0	<=1
β	0.18	>=0	<=1
S'	25.48	>=0	<=100

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

FROSTY GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0	4	-1.542009	3.986649	0.0133506	0.00017824	12	12	12
2	4	0	4	0.83646	6.365118	-2.365118	5.59378471	12	12	12
3	4	0	5	0.627632	6.15629	-1.15629	1.33700708	12	12	12
4	4	0	5	-0.495942	4.916714	0.0832864	0.00693662	12	12	13
5	6	0	10	-1.19253	4.104123	5.8958769	34.761364	12	12	14
6	10	0	15	0.735827	7.336463	7.6635368	58.7297959	10	10	20
7	10	0	30	1.342041	11.78265	18.21735	331.871837	5	5	30
8	10	0	30	1.082294	13.62283	16.377166	268.211552	0	0	55
9	10	0	25	1.479953	11.70044	13.299562	176.878354	0	0	75
10	8	0	20	-0.309578	7.590851	12.409149	153.986969	-5	0	95
11	8	0	25	-0.617124	5.311259	19.688741	387.646525	-10	0	112
12	8	0	20	-0.90446	2.471862	17.528138	307.235618	-15	0	134
13	8	0	10	-1.374388	1.537924	8.4620764	71.6067378	-7	0	138
14	8	0	5	-1.750865	0.233424	4.7665763	22.72025	-13	0	146
15	8	0	8	1.767096	3.635382	4.364618	19.0498901	-17	0	147
16	8	0	8	-0.331698	2.928622	5.0713782	25.7188769	-5	0	135
17	8	0	1	-0.309578	0	1	1	7	7	123
18	8	0	0	-0.617124	0	0	0	99	99	24
19	8	0	0	-0.90446	0	0	0	106	106	9
20	8	0	0	-1.374388	0	0	0	106	106	1
21	8	0	0	0.628801	0	0	0	99	99	0
22	8	0	0	-2.089048	0	0	0	91	91	0
23	8	0	0	-1.205849	0	0	0	83	83	0
24	8	0	1	-1.169859	0	1	1	75	75	0
25	7	0	0	0.932427	0	0	0	67	67	1
26	7	0	0	-0.287058	0	0	0	60	60	1
27	8	0	0	-0.063675	0	0	0	53	53	1
28	7	0	0	-1.815391	0	0	0	46	46	0
29	7	0	0	-2.532349	0	0	0	39	39	0
30	7	0	0	-0.656372	0	0	0	32	32	0
31	8	0	0	-2.300897	0	0	0	25	25	0
32	8	0	1	-1.2359	0.684792	0.3152079	0.09935604	17	17	0
33	8	0	10	1.153607	10.9583	-0.958296	0.91833036	9	9	1
34	8	0	15	-0.41874	16.22592	-1.225922	1.50288397	1	1	11
35	8	0	16	-0.940274	14.96435	1.0356536	1.07257846	-7	0	26
36	8	0	9	-0.563249	13.60133	-4.601329	21.1722321	-14	0	41
37	16	0	25	-0.120785	14.1598	10.840204	117.510017	-12	0	40
38	12	0	10	0.062724	13.18328	-3.183278	10.1332562	-13	0	50
39	8	0	10	-2.089048	11.72752	-1.727522	2.98433277	-9	0	44
40	8	0	12	-1.205849	12.49472	-0.494719	0.24474646	-8	0	45
	mean of the disturbance			-0.452955		3.756744	mean of the standard errors			
	std dev of the disturbance			1.140399						

Σ (AO-Ot)2	156.6377		constraints		
θ	0.00		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.12		>=0	<=1	
S'	18.92		>=0	<=100	
	Standard GRG NonLinear				

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

FROSTY GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	3.316172	4	-1.082343	0	4	16	12	12	12
2	4	3.883095	4	-2.766244	0	4	16	12	12	12
3	4	3.980014	3	-0.352526	1.306448	1.6935517	2.86811753	12	12	12
4	5	3.996583	2	0.778781	2.551034	-0.551034	0.30363881	12	12	11
5	5	4.828459	3	0.751134	3.645393	-0.645393	0.41653176	11	11	9
6	10	4.970674	3	-0.37097	2.858924	0.1410763	0.01990253	10	10	8
7	15	9.140202	25	0.474392	8.550784	16.449216	270.576723	3	3	8
8	30	13.99823	5	-1.082343	9.917874	-4.917874	24.1854804	-10	0	31
9	30	27.26439	50	-2.766244	21.30671	28.693288	823.304775	-37	0	33
10	25	29.53233	50	-0.352526	21.443	28.556998	815.502118	-64	0	80
11	20	25.77483	15	0.778781	15.52868	-0.528675	0.27949736	-73	0	114
12	25	20.98725	25	0.751134	9.456213	15.543787	241.609314	-91	0	127
13	20	24.31399	25	-0.37097	9.629943	15.370057	236.238638	-112	0	148
14	10	20.73751	15	0.474392	6.415271	8.5847294	73.6975793	-112	0	153
15	5	11.83565	1	-1.082343	0	1	1	-102	0	148
16	8	6.168602	0	-2.766244	0	0	0	-7	0	49
17	8	7.68691	5	-0.352526	4.046244	0.9537561	0.90965066	18	18	16
18	1	7.946475	2	0.778781	5.727246	-3.727246	13.892364	25	25	6
19	0	2.187548	1	0.751134	0	1	1	25	25	7
20	0	0.373977	0	-0.37097	0	0	0	25	25	8
21	0	0.063934	0	1.882069	0	0	0	30	30	3
22	0	0.01093	0	-0.355583	0	0	0	32	32	1
23	0	0.001869	5	0.713346	0	5	25	33	33	0
24	0	0.000319	5	0.723875	0	5	25	33	33	5
25	1	5.46E-05	2	-0.415888	0	2	4	33	33	10
26	0	0.829052	1	0.019166	0	1	1	32	32	12
27	0	0.141732	0	-0.867657	0	0	0	37	37	8
28	0	0.02423	0	-0.527571	0	0	0	42	42	3
29	0	0.004142	0	0.729722	0	0	0	44	44	1
30	0	0.000708	2	-1.334704	0	2	4	45	45	0
31	0	0.000121	2	0.257782	0	2	4	45	45	2
32	0	2.07E-05	2	-1.429559	0	2	4	45	45	4
33	1	3.54E-06	10	-1.912513	0	10	100	45	45	6
34	10	0.829044	5	0.351084	0	5	25	46	46	14
35	15	8.432161	5	-0.8279	2.285212	2.7147879	7.37007341	38	38	17
36	18	13.87718	10	0.490179	10.01541	-0.015412	0.00023752	25	25	20
37	9	15.63709	8	0.764423	12.62982	-4.629823	21.4352597	19	19	20
38	25	10.13466	5	-1.618467	4.84121	0.1587899	0.02521424	15	15	23
39	10	22.45867	20	-0.231402	20.00293	-0.002934	8.6082E-06	-5	0	23
40	10	12.1299	10	0.27436	9.212826	0.7871739	0.61964269	-5	0	33
	mean of the disturbance			-0.313487		4.352315	mean of the standard errors			
	std dev of the disturbance			1.114982						

Σ (AO-Ot)2	221.4504		constraints		
θ	0.83		>=0	<=1	
αs	0.10		>=0	<=1	
β	1.00		>=0	<=1	
S'	0.00		>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0,eIO+\alpha s(s'-S_t-\beta SL_t)+\varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

FROSTY GAME MODEL WEEKS 21 TO 40

FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.252356	4	0.360619	0.612976	3.3870243	11.4719336	12	12	8
2	4	0.488792	4	-0.927531	0	4	16	12	12	8
3	4	0.710311	4	-1.644194	0	4	16	12	12	8
4	3	0.917855	4	-0.165501	0.752353	3.2476468	10.5472096	12	12	8
5	2	1.049215	3	2.218679	3.267895	-0.267895	0.07176758	13	13	8
6	3	1.109199	0	1.782865	2.892065	-2.892065	8.36403875	15	15	7
7	3	1.228488	2	0.342254	1.570742	0.4292578	0.18426223	16	16	3
8	25	1.340252	4	-1.328515	0.011736	3.9882636	15.9062469	16	16	2
9	5	2.832924	20	-0.841963	1.990961	18.009039	324.32547	-9	0	6
10	50	2.969643	20	0.498547	3.46819	16.53181	273.300742	-12	0	24
11	50	5.936747	100	-0.75338	5.183367	94.816633	8990.19383	-58	0	40
12	15	8.716659	50	0.642437	9.359095	40.640905	1651.68314	-88	0	120
13	25	9.113069	50	1.782865	10.89593	39.104066	1529.12794	-83	0	150
14	25	10.11536	100	0.342254	10.45762	89.542385	8017.83863	-8	0	100
15	15	11.05442	50	-1.328515	9.725905	40.274095	1622.00271	17	17	150
16	1	11.30334	10	-0.841963	10.46138	-0.461381	0.21287216	52	52	150
17	0	10.65331	10	0.498547	11.15186	-1.151862	1.32678497	151	151	60
18	5	9.981206	20	-0.75338	9.227827	10.772173	116.039714	201	201	20
19	2	9.666946	10	0.642437	10.30938	-0.309383	0.09571783	206	206	30
20	1	9.183246	1	1.782865	10.96611	-9.966111	99.3233661	214	214	30
21	0	8.666972	10	-0.046951	8.620021	1.3799792	1.90434255	233	233	11
22	0	8.12018	10	-0.49804	7.62214	2.37786	5.65421812	243	243	11
23	0	7.607885	10	0.404578	8.012463	1.9875369	3.95030278	244	244	20
24	5	7.12791	10	-0.229076	6.898834	3.1011655	9.61722756	254	254	20
25	5	6.993662	10	-0.078379	6.915283	3.0847166	9.51547653	259	259	20
26	2	6.867884	10	-0.839006	6.028878	3.9711217	15.7696075	264	264	20
27	1	6.560774	10	-0.326737	6.234037	3.7659633	14.1824798	272	272	20
28	0	6.209949	10	-0.489354	5.720595	4.2794052	18.3133085	281	281	20
29	0	5.818169	10	1.258945	7.077114	2.9228862	8.54326363	291	291	20
30	0	5.451106	10	-1.167455	4.283651	5.7163491	32.6766476	301	301	20
31	2	5.1072	10	-0.115007	4.992194	5.0078061	25.0781223	311	311	20
32	2	4.91117	10	0.58973	5.5009	4.4990999	20.2418997	319	319	20
33	2	4.727507	10	0.824442	5.551948	4.4480517	19.785164	327	327	20
34	10	4.555431	10	-1.035432	3.519999	6.4800013	41.9904172	335	335	20
35	5	4.898924	10	-0.679693	4.219231	5.780769	33.4172897	335	335	20
36	5	4.905301	10	0.041849	4.94715	5.05285	25.531293	340	340	20
37	10	4.911275	10	-0.109725	4.80155	5.1984501	27.0238838	345	345	20
38	8	5.232318	10	1.434681	6.666999	3.333001	11.1088956	345	345	20
39	5	5.406929	10	0.855326	6.062254	3.9377455	15.50584	347	347	20
40	20	5.381256	10	-0.195787	5.185469	4.8145313	23.1797114	352	352	20
	mean of the disturbance			-0.003372		11.785638	mean of the standard errors			
	std dev of the disturbance			0.983155						

			constraints	
Σ (AO-Ot)2	362.9898			
θ	0.06		>=0	<=1
αs	0.00		>=0	<=1
β	0.88		>=0	<=1
S'	59.37		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = FIO

Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
AO = FPR

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$

Error Term:
$AO - O_t$

Squared errors:
$(AO - O_t)^2$

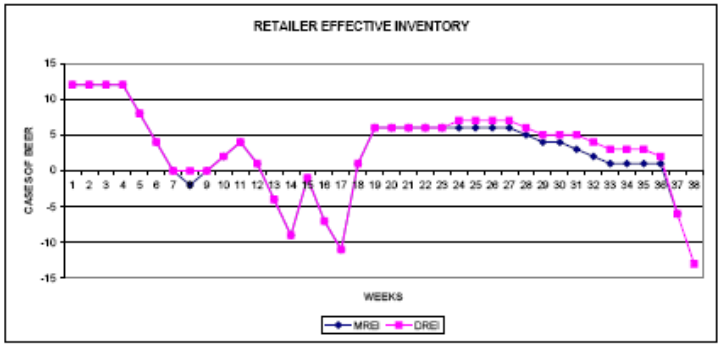
Effective Inventory:
EI = MFEI

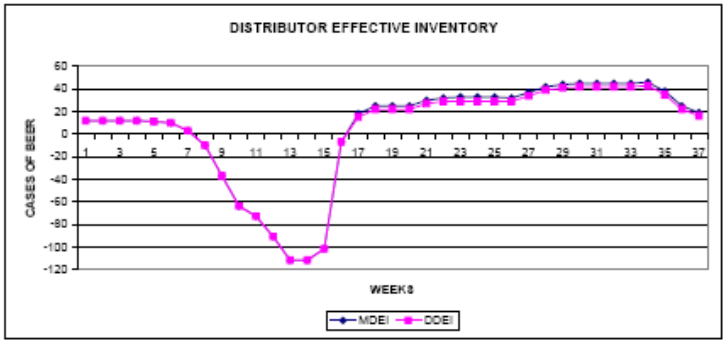
Stock:
St = MAX(0,EI)

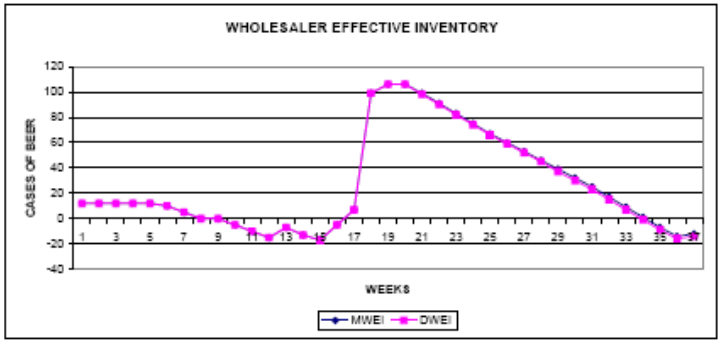
Supply Line:
SLt = FSL = FPD1+FPD2

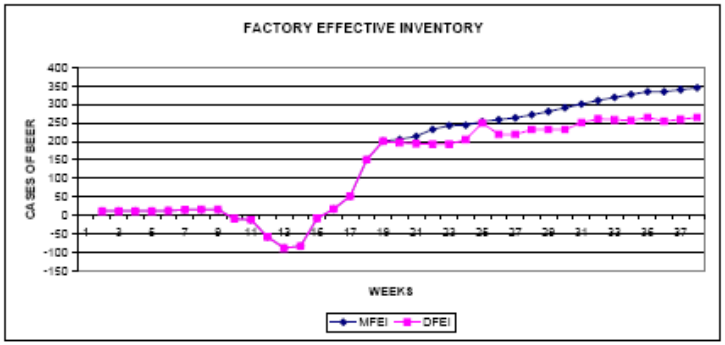
FROSTY GAME MODEL WEEKS 21 TO 40

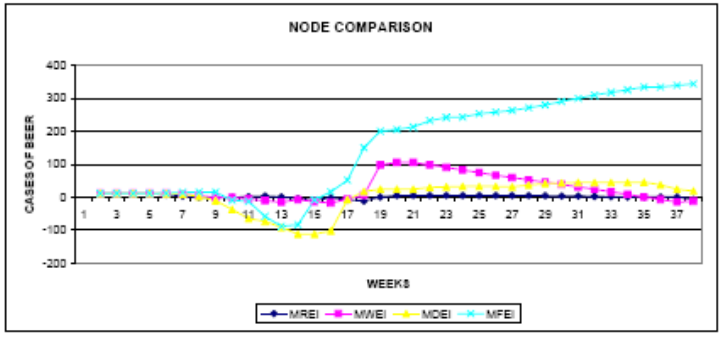
MODEL CHARTS



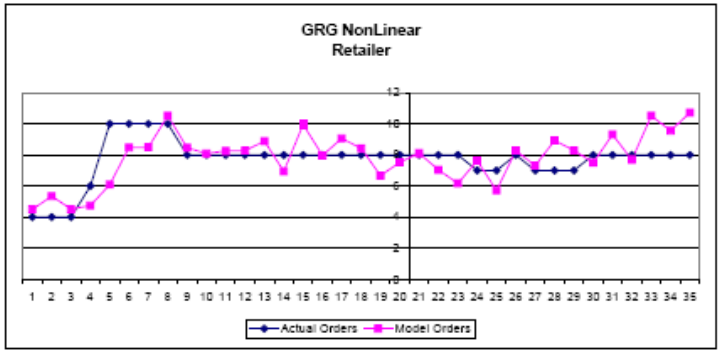


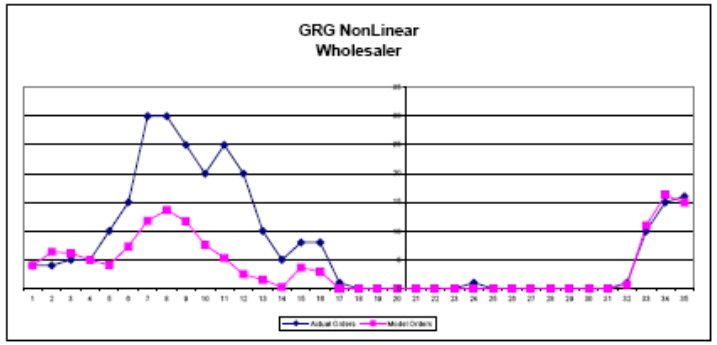


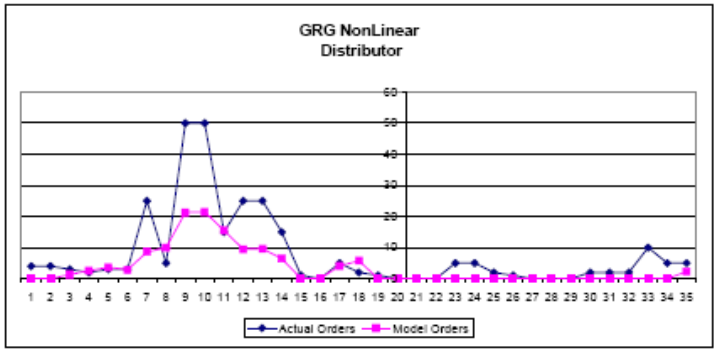


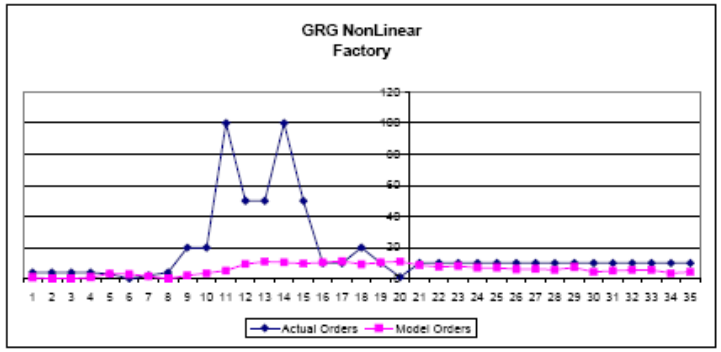


FROSTY GAME MODEL WEEKS 21 TO 40 ORDER CHARTS









FROSTY GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	FROSTY	NO IT								FROSTY	Retailer	NO IT				
	Team Costs	$ 5,571.50								Costs	$ 140.00					
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	4	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	6	4	12		16	4
5	8	16	4	4	0	8	8	8	*8*	28	10	6	14		16	4
6	8	12	4	6	0	8	4	4	*4*	30	10	10	20		16	5
7	8	8	6	10	0	8	0	0	*0*	30	10	10	26		15	5
8	8	6	10	10	2	6	0	-2	*0*	32	10	10	30		10	10
9	8	10	10	10	0	10	0	0	*0*	32	8	10	30		10	5
10	8	10	10	5	0	8	2	2	*2*	33	8	8	28		5	3
11	8	12	5	3	0	8	4	4	*4*	35	8	8	26		3	3
12	8	9	3	3	0	8	1	1	*1*	35.5	8	8	29		3	16
13	8	4	3	16	4	4	0	-4	*-4*	39.5	8	8	34		16	2
14	8	3	16	2	9	3	0	-9	*-9*	49.5	8	8	39		2	4
15	8	16	2	4	1	16	0	-1	*-1*	49.5	8	8	31		4	20
16	8	2	4	20	7	2	0	-7	*-7*	56.5	8	8	37		20	20
17	8	4	20	13	11	4	0	-11	*-11*	67.5	8	8	41		20	100
18	8	20	13	8	0	19	1	1	*1*	68	8	8	29		107	15
19	8	14	8	8	0	8	6	6	*6*	71	8	8	24		114	8
20	8	14	8	8	0	8	6	6	*6*	74	8	8	24		114	1
21	8	14	8	8	0	8	6	6	*6*	77	8	8	24		107	0
22	8	14	8	8	0	8	6	6	*6*	80	8	8	24		99	0
23	8	14	8	8	0	8	6	6	*6*	83	8	8	24		91	0
24	8	14	8	8	0	8	6	6	*7*	86	7	8	24		83	0
25	8	14	8	8	0	8	6	6	*7*	89	7	7	23		75	0
26	8	14	8	7	0	8	6	6	*7*	92	8	7	22		67	0
27	8	14	7	7	0	8	6	6	*7*	95	7	8	22		60	1
28	8	13	7	8	0	8	5	5	*6*	97.5	7	7	22		54	0
29	8	12	8	7	0	8	4	4	*5*	99.5	7	7	22		46	0
30	8	12	7	7	0	8	4	4	*5*	101.5	8	7	21		39	0
31	8	11	7	7	0	8	3	3	*5*	103	8	8	22		32	0
32	8	10	7	8	0	8	2	2	*4*	104	8	8	23		25	0
33	8	9	8	8	0	8	1	1	*3*	104.5	8	8	24		17	0
34	8	9	8	8	0	8	1	1	*3*	105	8	8	24		9	0
35	8	9	8	1	0	8	1	1	*3*	105.5	8	8	24		1	1
36	8	9	1	1	0	8	1	1	*2*	106	16	8	24		1	10
37	8	2	1	10	6	2	0	-6	*-6*	112	12	16	39		10	15
38	8	1	10	15	13	1	0	-13	*-13*	125	8	12	50		15	16
39	8	10	15	16	11	10	0	-11	*-11*	136	8	8	48		16	9
40	8	15	16	9	4	15	0	-4	*-4*	140	8	8	41		9	20

FROSTY GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

FROSTY Costs | Wholesaler $ 680.00 | NO IT | FROSTY Costs

WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL	DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4		12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12	16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12	16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	5	4	12	16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	5	5	13	16	4	4	0	12	12	*12*
5	5	0	12	12	*12*	30	10	5	14	16	4	3	0	11	11	*11*
6	5	0	10	10	*10*	35	15	10	20	15	3	2	0	10	10	*10*
7	10	0	5	5	*5*	37.5	30	15	30	13	2	3	0	3	3	*3*
8	5	0	0	0	*0*	37.5	30	30	55	5	3	3	10	0	-10	*-10*
9	3	0	0	0	*0*	37.5	25	30	75	3	3	16	37	0	-37	*-37*
10	3	5	0	-5	*-5*	42.5	20	25	95	3	16	2	64	0	-64	*-64*
11	16	10	0	-10	*-10*	52.5	25	20	112	16	2	4	73	0	-73	*-73*
12	2	15	0	-15	*-15*	67.5	20	25	134	2	4	20	91	0	-91	*-91*
13	4	7	0	-7	*-7*	74.5	10	20	138	4	20	20	112	0	-112	*-112*
14	20	13	0	-13	*-13*	87.5	5	10	146	20	20	100	112	0	-112	*-112*
15	20	17	0	-17	*-17*	104.5	8	5	147	20	100	33	102	0	-102	*-102*
16	100	5	0	-5	*-5*	109.5	8	8	135	100	33	15	7	0	-7	*-7*
17	15	0	7	7	*7*	113	1	8	123	33	15	1	0	18	18	*15*
18	8	0	99	99	*99*	162.5	0	1	24	33	1	0	0	25	25	*22*
19	1	0	106	106	*106*	215.5	0	0	9	26	0	5	0	25	25	*22*
20	0	0	106	106	*106*	268.5	0	0	1	25	5	2	0	25	25	*22*
21	0	0	99	99	*98*	318	0	0	0	30	2	1	0	30	30	*27*
22	0	0	91	91	*90*	363.5	0	0	0	32	1	0	0	32	32	*29*
23	0	0	83	83	*82*	405	0	0	0	33	0	0	0	33	33	*29*
24	0	0	75	75	*74*	442.5	1	0	0	33	0	0	0	33	33	*29*
25	0	0	67	67	*66*	476	0	1	1	33	0	5	0	33	33	*29*
26	1	0	60	60	*59*	506	0	0	1	33	5	5	0	32	32	*29*
27	0	0	53	53	*52*	532.5	0	0	1	37	5	2	0	37	37	*34*
28	0	0	46	46	*45*	555.5	0	0	0	42	2	1	0	42	42	*39*
29	0	0	39	39	*37*	575	0	0	0	44	1	0	0	44	44	*41*
30	0	0	32	32	*30*	591	0	0	0	45	0	0	0	45	45	*42*
31	0	0	25	25	*23*	603.5	0	0	0	45	0	0	0	45	45	*42*
32	0	0	17	17	*15*	612	1	0	0	45	0	2	0	45	45	*42*
33	0	0	9	9	*7*	616.5	10	1	1	45	2	2	0	45	45	*42*
34	1	0	1	1	*-1*	617	15	10	11	47	2	2	0	46	46	*43*
35	10	7	0	-7	*-9*	624	16	15	26	48	2	10	0	38	38	*35*
36	15	14	0	-14	*-16*	638	9	16	41	40	10	5	0	25	25	*22*
37	16	12	0	-12	*-14*	650	25	9	40	35	5	5	0	19	19	*16*
38	9	13	0	-13	*-15*	663	10	25	50	24	5	10	0	15	15	*12*
39	20	9	0	-9	*-11*	672	10	10	44	20	10	8	5	0	-5	*-8*
40	10	8	0	-8	*-10*	680	12	10	45	10	8	5	5	0	-5	*-8*

FROSTY GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		NO IT									FROSTY	Factory	NO IT		
	$ 1,020.00											Costs	$ 3,731.50			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	3	4	12		16	4	4	0	12	12	*12*	18	4	8	
4	24	2	3	11		16	4	4	0	12	12	*12*	24	4	8	
5	29.5	3	2	9		16	4	4	0	13	13	*13*	30.5	3	8	
6	34.5	3	3	8		17	4	3	0	15	15	*15*	38	0	7	
7	36	25	3	8		19	3	0	0	16	16	*16*	46	2	3	
8	46	5	25	31		19	0	2	0	16	16	*16*	54	4	2	
9	83	50	5	33		16	2	4	9	0	-9	*-9*	63	20	6	
10	147	50	50	80		2	4	20	12	0	-12	*-12*	75	20	24	
11	220	15	50	114		4	20	20	58	0	-58	*-58*	133	100	40	
12	311	25	15	127		20	20	100	88	0	-88	*-88*	221	50	120	
13	423	25	25	148		20	100	50	83	0	-83	*-83*	304	50	150	
14	535	15	25	153		100	50	50	8	0	-8	*-8*	312	100	100	
15	637	1	15	148		50	50	100	0	17	17	*17*	320.5	50	150	
16	644	0	1	49		67	100	50	0	52	52	*52*	346.5	10	150	
17	653	5	0	16		152	50	10	0	151	151	*151*	422	10	60	
18	665.5	2	5	6		201	10	10	0	201	201	*201*	522.5	20	20	
19	678	1	2	7		211	10	20	0	206	206	*196*	625.5	10	30	
20	690.5	0	1	8		216	20	10	0	214	214	*194*	732.5	1	30	
21	705.5	0	0	3		234	10	1	0	233	233	*193*	849	10	11	
22	721.5	0	0	1		243	1	10	0	243	243	*193*	970.5	10	11	
23	738	5	0	0		244	10	10	0	244	244	*205*	1092.5	10	20	
24	754.5	5	5	5		254	10	10	0	254	254	*250*	1219.5	10	20	
25	771	2	5	10		264	10	10	0	259	259	*219*	1349	10	20	
26	787	1	2	12		269	10	10	0	264	264	*219*	1481	10	20	
27	805.5	0	1	8		274	10	10	0	272	272	*232*	1617	10	20	
28	826.5	0	0	3		282	10	10	0	281	281	*232*	1757.5	10	20	
29	848.5	0	0	1		291	10	10	0	291	291	*232*	1903	10	20	
30	871	2	0	0		301	10	10	0	301	301	*251*	2053.5	10	20	
31	893.5	2	2	2		311	10	10	0	311	311	*261*	2209	10	20	
32	916	2	2	4		321	10	10	0	319	319	*259*	2368.5	10	20	
33	938.5	10	2	6		329	10	10	0	327	327	*257*	2532	10	20	
34	961.5	5	10	14		337	10	10	0	335	335	*265*	2699.5	10	20	
35	980.5	5	5	17		345	10	10	0	335	335	*255*	2867	10	20	
36	993	10	5	20		345	10	10	0	340	340	*260*	3037	10	20	
37	1002.5	8	10	20		350	10	10	0	345	345	*265*	3209.5	10	20	
38	1010	5	8	23		355	10	10	0	345	345	*265*	3382	10	20	
39	1015	20	5	23		355	10	10	0	347	347	*267*	3555.5	10	20	
40	1020	10	20	33		357	10	10	0	352	352	*272*	3731.5	10	20	

FROSTY GAME MODEL WEEKS 21 TO 40 MODEL DATA

FROSTY NO IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	4	12	5	12	3	12	4	12
4	6	12	5	12	2	12	4	12
5	10	8	10	12	3	11	3	13
6	10	4	15	10	3	10	0	15
7	10	0	30	5	25	3	2	16
8	10	0	30	0	5	-10	4	16
9	8	0	25	0	50	-37	20	-9
10	8	2	20	-5	50	-64	20	-12
11	8	4	25	-10	15	-73	100	-58
12	8	1	20	-15	25	-91	50	-88
13	8	-4	10	-7	25	-112	50	-83
14	8	-9	5	-13	15	-112	100	-8
15	8	-1	8	-17	1	-102	50	17
16	8	-7	8	-5	0	-7	10	52
17	8	-11	1	7	5	15	10	151
18	8	1	0	99	2	22	20	201
19	8	6	0	106	1	22	10	196
20	8	6	0	106	0	22	1	194
21	8	6	0	98	0	27	10	193
22	8	6	0	90	0	29	10	193
23	8	6	0	82	5	29	10	205
24	7	7	1	74	5	29	10	250
25	7	7	0	66	2	29	10	219
26	8	7	0	59	1	29	10	219
27	7	7	0	52	0	34	10	232
28	7	6	0	45	0	39	10	232
29	7	5	0	37	0	41	10	232
30	8	5	0	30	2	42	10	251
31	8	5	0	23	2	42	10	261
32	8	4	1	15	2	42	10	259
33	8	3	10	7	10	42	10	257
34	8	3	15	-1	5	43	10	265
35	8	3	16	-9	5	35	10	255
36	16	2	9	-16	10	22	10	260
37	12	-6	25	-14	8	16	10	265
38	8	-13	10	-15	5	12	10	265
39	8	-11	10	-11	20	-8	10	267
40	8	-4	12	-10	10	-8	10	272

FROSTY 2 GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	-0.539317	13.59593	-9.595928	92.0818267	12	12	12
2	4	0.16	4	2.11379	16.41309	-12.41309	154.084747	12	12	12
3	4	0.32	4	0.192003	14.64863	-10.64863	113.393215	12	12	12
4	4	0.47	4	-2.347622	12.25987	-8.259873	68.2254976	12	12	12
5	8	0.62	8	-0.13756	15.56302	-7.563019	57.1992576	8	8	12
6	8	0.92	10	-0.729895	15.50109	-5.501092	30.2620096	4	4	16
7	8	1.21	12	0.581156	16.96673	-4.966732	24.6684289	0	0	22
8	8	1.49	16	0.176711	15.39677	0.6032325	0.3638895	-4	0	30
9	8	1.76	12	-1.140999	12.90212	-0.902118	0.81381693	-4	0	38
10	8	2.01	20	0.542189	14.48041	5.5195912	30.4658873	-2	0	40
11	8	2.26	8	-0.261313	11.39551	-3.395514	11.5295186	-4	0	54
12	8	2.49	12	0.111968	12.00432	-0.00432	1.8666E-05	-4	0	54
13	8	2.72	16	-0.41273	11.34449	4.6555108	21.6737807	-2	0	56
14	8	2.94	8	-1.162564	9.006265	-1.006265	1.01256909	-4	0	66
15	8	3.14	20	0.179006	10.55555	9.4444469	89.1975777	-4	0	66
16	8	3.34	20	-0.324691	8.446063	11.553937	133.493468	-2	0	76
17	8	3.53	23	-0.921265	6.122324	16.877676	284.855959	2	2	84
18	8	3.72	12	0.698544	4.609043	7.3909566	54.6262389	-4	0	105
19	8	3.89	10	-0.361122	3.36406	6.6359401	44.035701	-2	0	107
20	8	4.06	0	0.970964	4.01561	-4.01561	16.1251217	15	15	92
21	8	4.22	0	1.356722	5.043714	-5.043714	25.4390519	32	32	67
22	8	4.38	0	-0.725108	4.448616	-4.448616	19.7901819	34	34	57
23	8	4.53	0	-0.104836	6.548265	-6.548265	42.8797735	36	36	47
24	8	4.67	0	-2.496015	3.53714	-3.53714	12.5113592	75	75	0
25	8	4.80	0	0.848567	8.91417	-8.91417	79.462423	67	67	0
26	8	4.94	10	0.067869	10.16131	-0.161315	0.02602245	59	59	0
27	8	5.08	12	1.033405	11.34433	0.6556732	0.42990739	51	51	10
28	8	5.18	10	-0.193696	9.96855	0.03145	0.0009891	43	43	22
29	8	5.30	10	-1.26401	9.105615	0.8943848	0.79992409	35	35	32
30	8	5.41	12	-0.380663	9.625594	2.3744063	5.63780525	37	37	32
31	8	5.51	12	0.931191	10.09533	1.904667	3.62775654	41	41	32
32	8	5.62	12	2.14613	10.577	1.4229998	2.02492839	43	43	34
33	8	5.71	12	-1.853167	5.840252	6.1597485	37.9425015	45	45	36
34	8	5.81	10	0.10793	6.946686	3.0533141	9.32272691	49	49	36
35	8	5.90	8	-1.239423	5.102824	2.8971759	8.39362797	53	53	34
36	9	5.98	6	-1.26401	4.937041	1.0629592	1.12998236	57	57	30
37	10	6.11	6	-0.380663	6.078667	-0.078667	0.0061885	61	61	24
38	11	6.27	10	0.931191	7.797942	2.2020581	4.84906002	63	63	20
39	12	6.48	10	2.14613	8.845973	1.1540265	1.33177724	63	63	22
40	13	6.69	10	-1.853167	5.052427	4.9475728	24.4784764	57	57	30
	mean of the disturbance			-0.12959		-0.424294	mean of the standard errors			
	std dev of the disturbance			1.071137						

Σ (AO-Ot)2	280.0844		constraints	
θ	0.04		>=0	<=1
αs	0.24		>=0	<=1
β	0.76		>=0	<=1
S'	80.75		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

FROSTY 2 GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	-1.898074	3.158223	0.8417774	0.70858925	12	12	12
2	4	4	4	-0.944252	4.112044	-0.112044	0.01255393	12	12	12
3	4	4	4	-1.867418	3.188878	0.8111215	0.65791812	12	12	12
4	4	4	4	0.267695	5.323991	-1.323991	1.75295343	12	12	12
5	4	4	4	1.265783	6.32208	-2.32208	5.39205346	12	12	12
6	8	4	8	-0.126848	4.929448	3.0705518	9.42828851	12	12	12
7	10	8	10	-0.115997	9.410743	0.5892574	0.34722431	8	8	18
8	12	10	12	-0.362936	11.86947	0.1305311	0.01703836	2	2	22
9	16	12	14	0.220931	14.68856	-0.688557	0.47411104	-6	0	30
10	12	16	30	0.708362	19.17599	10.824012	117.159239	-14	0	36
11	20	12	20	0.663653	15.13128	4.8687209	23.7044432	-16	0	56
12	8	20	16	-0.154951	22.31268	-6.312675	39.849871	-30	0	70
13	12	8	12	0.128898	10.59651	1.4034853	1.96977088	-30	0	78
14	16	12	12	-1.965838	12.50179	-0.501789	0.25179185	-32	0	80
15	8	16	20	0.073199	18.54082	1.4591752	2.1291923	-36	0	80
16	20	8	20	-1.71739	8.750236	11.249764	126.557186	-42	0	98
17	20	20	20	-1.246855	21.22077	-1.220771	1.49028263	-52	0	108
18	23	20	20	0.186377	22.654	-2.654004	7.04373465	-47	0	103
19	12	23	16	-1.898074	23.56955	-7.569553	57.2981268	-45	0	98
20	10	12	20	-0.944252	13.52337	6.4766256	41.9466797	-47	0	104
21	0	10	20	-0.275635	12.19199	7.8080086	60.964999	-47	0	114
22	0	0	0	0.150086	2.26488	-2.26488	5.12968082	3	3	84
23	0	0	0	-0.920077	0	0	0	47	47	40
24	0	0	0	0.771343	0	0	0	67	67	20
25	0	0	0	0.603589	0	0	0	87	87	0
26	0	0	0	-0.423651	0	0	0	87	87	0
27	10	0	0	-0.249408	0	0	0	87	87	0
28	12	10	5	1.580457	4.992048	0.0079516	6.3228E-05	77	77	0
29	10	12	5	0.86331	7.686232	-2.686232	7.21584023	65	65	5
30	10	10	10	0.239907	6.238937	3.7610632	14.1455961	55	55	10
31	12	10	5	-1.513819	5.66132	-0.66132	0.43734421	45	45	20
32	12	12	10	-1.113758	8.884657	1.1153433	1.24399073	38	38	20
33	12	12	10	-1.003865	9.817825	0.1821747	0.03318764	31	31	25
34	12	12	10	-0.370108	10.80441	-0.804415	0.64708318	28	28	26
35	10	12	10	-1.842659	10.50797	-0.507972	0.25803532	18	18	34
36	8	10	10	-0.148801	11.14272	-1.142717	1.30580257	10	10	42
37	6	8	10	0.390836	10.62324	-0.623241	0.38842921	2	2	52
38	6	6	5	0.666099	9.133725	-4.133725	17.0876835	-4	0	62
39	10	6	10	-0.031844	8.435782	1.564218	2.44677783	-5	0	62
40	10	10	10	-0.853432	11.61419	-1.614194	2.60562284	-14	0	71
	mean of the disturbance			-0.378065		0.713408	mean of the standard errors			
	std dev of the disturbance			0.97419						

Σ (AO-Ot)2	113.9101	constraints	
θ	1.00	>=0	<=1
αs	0.12	>=0	<=1
β	0.00	>=0	<=1
S'	20.98	>=0	<=100

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

FROSTY 2 GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.030895	4	-0.852161	0	4	16	12	12	12
2	4	0.061551	4	1.478435	0	4	16	12	12	12
3	4	0.09197	4	-1.346182	0	4	16	12	12	12
4	4	0.122155	4	-0.396829	0	4	16	12	12	12
5	4	0.152106	4	-0.638528	0	4	16	12	12	12
6	4	0.181826	4	-0.012536	0	4	16	12	12	12
7	8	0.211316	8	0.797343	0	8	64	12	12	12
8	10	0.271474	10	-0.852161	0	10	100	8	8	16
9	12	0.346614	20	1.478435	2.214518	17.785482	316.323387	2	2	22
10	14	0.436621	10	-1.346182	0	10	100	-6	0	38
11	30	0.54138	8	-0.396829	1.009225	6.9907752	48.8709382	-12	0	40
12	20	0.768909	50	-0.313223	1.32036	48.67964	2369.70734	-32	0	38
13	16	0.917444	30	-0.157455	1.624683	28.375337	805.15973	-40	0	76
14	12	1.033937	20	0.002587	1.901198	18.098802	327.566619	-54	0	104
15	12	1.118635	20	0.211018	2.194328	17.805672	317.041972	-56	0	114
16	20	1.20268	10	-1.042912	1.024441	8.9755587	80.5606547	-43	0	109
17	20	1.347864	20	-1.547048	0.66549	19.33451	373.823277	-38	0	94
18	20	1.491927	20	-0.013286	2.343316	17.656684	311.768496	-48	0	104
19	20	1.634878	20	0.395699	2.895251	17.104749	292.57244	-58	0	114
20	16	1.776724	12	0.446622	3.08802	8.9119799	79.4233866	-28	0	84
21	20	1.886581	5	-0.240093	2.511162	2.4888379	6.19431415	0	0	52
22	20	2.026483	0	-1.344325	1.546832	-1.546832	2.39268814	0	0	37
23	0	2.165305	0	0.89217	3.922149	-3.922149	15.3832527	0	0	17
24	0	2.148581	0	-1.337739	0	0	0	12	12	5
25	0	2.131986	0	1.03531	0	0	0	17	17	0
26	0	2.115519	0	-1.237805	0	0	0	17	17	0
27	0	2.099179	0	1.661873	0.586479	-0.586479	0.34395752	17	17	0
28	0	2.082966	2	-0.859738	0	2	4	17	17	0
29	5	2.066878	2	0.319475	0	2	4	17	17	2
30	5	2.089532	2	0.930329	1.033302	0.9666976	0.93450417	12	12	4
31	10	2.112012	0	-1.123614	0.189852	-0.189852	0.03604385	7	7	6
32	5	2.172936	0	-0.510495	2.527115	-2.527115	6.38630892	-1	0	4
33	10	2.194771	5	-0.628231	2.431214	2.5687856	6.59865968	-4	0	2
34	10	2.255057	1	-0.530048	2.589683	-1.589683	2.5270909	-12	0	5
35	10	2.314876	2	-0.724919	2.454631	-0.454631	0.20668962	-22	0	6
36	10	2.374234	10	1.369733	4.608641	5.391359	29.0667524	-32	0	8
37	10	2.433133	1	1.008798	4.306605	-3.306605	10.9336355	-37	0	13
38	10	2.491577	5	-0.707469	2.648781	2.3512186	5.52822909	-46	0	13
39	5	2.549569	10	1.421907	4.83615	5.1638497	26.6653432	-54	0	16
40	10	2.568496	0	1.2879	4.72107	-4.72107	22.2885005	-49	0	16
	mean of the disturbance			-0.222944		7.4550506	mean of the standard errors			
	std dev of the disturbance			0.896384						

Σ (AO-Ot)2	143.488		constraints		
θ	0.01		>=0	<=1	
αs	0.24		>=0	<=1	
β	0.00		>=0	<=1	
S'	3.64		>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

FROSTY 2 GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTOR\	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0	4	1.564249	5.081804	-1.081804	1.17029981	12	12	8
2	4	0	4	0.157508	3.675063	0.3249373	0.10558423	12	12	8
3	4	0	4	0.073372	3.590927	0.4090734	0.16734103	12	12	8
4	4	0	4	0.230985	3.74852	0.2514799	0.06324216	12	12	8
5	4	0	4	0.998597	4.516152	-0.516152	0.26641325	12	12	8
6	4	0	8	1.379625	4.89718	3.1028196	9.62748978	12	12	8
7	4	0	4	-0.081315	0.530568	3.4694325	12.0369616	12	12	12
8	8	0	6	1.564249	2.176131	3.823869	14.6219744	12	12	12
9	10	0	2	0.157508	2.222226	-0.222226	0.0493845	12	12	10
10	20	0	10	0.073372	7.949436	2.0505639	4.2048122	6	6	8
11	10	0	25	0.230985	9.559866	15.440134	238.397736	-8	0	12
12	8	0	25	0.998597	0	25	625	-16	0	35
13	50	0	10	1.379625	0	10	100	-14	0	50
14	30	0	10	-0.081315	0	10	100	-39	0	35
15	20	0	50	1.564249	5.081804	44.918196	2017.64434	-44	0	20
16	20	0	70	0.157508	0	70	4900	-54	0	60
17	10	0	25	0.073372	0	25	625	-64	0	120
18	20	0	50	0.230985	0	50	2500	-24	0	95
19	20	0	20	0.998597	0	20	400	26	26	75
20	20	0	10	1.379625	0	10	100	31	31	70
21	12	0	0	1.991959	0	0	0	61	61	30
22	5	0	0	-1.342855	0	0	0	69	69	10
23	0	0	0	-0.194693	0	0	0	74	74	0
24	0	0	0	-1.366345	0	0	0	74	74	0
25	0	0	0	0.101777	0	0	0	74	74	0
26	0	0	0	-0.72205	0	0	0	74	74	0
27	0	0	0	-0.263666	0	0	0	74	74	0
28	0	0	0	-0.048805	0	0	0	74	74	0
29	2	0	0	0.049681	0	0	0	74	74	0
30	2	0	0	-1.579379	0	0	0	72	72	0
31	2	0	0	1.201052	0	0	0	70	70	0
32	0	0	0	1.157248	0	0	0	68	68	0
33	0	0	0	-0.922755	0	0	0	68	68	0
34	5	0	0	0.206673	0	0	0	68	68	0
35	1	0	0	0.289533	0	0	0	63	63	0
36	2	0	0	2.064758	0	0	0	62	62	0
37	10	0	0	0.236583	0	0	0	60	60	0
38	1	0	0	0.216009	0	0	0	50	50	0
39	5	0	0	1.199689	0	0	0	49	49	0
40	10	0	0	0.261282	0	0	0	44	44	0
	mean of the disturbance			0.331648		8.3420092	mean of the standard errors			
	std dev of the disturbance			0.891013						

Σ (AO-Ot)2	0		constraints	
θ	0.00		>=0	<=1
αs	0.73		>=0	<=1
β	1.00		>=0	<=1
S'	24.84		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = FIO

Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$

Actual Orders:
AO = FPR

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$

Error Term:
$AO - O_t$

Squared errors:
$(AO - O_t)^2$

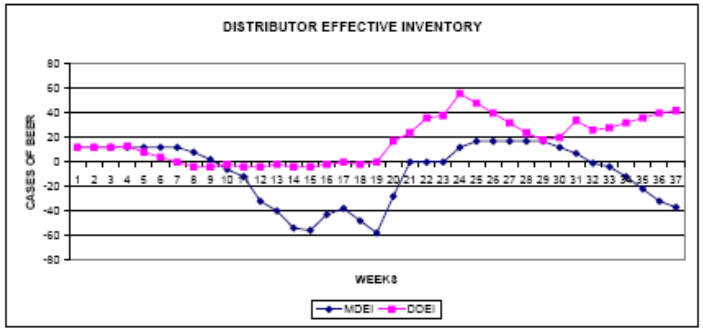
Effective Inventory:
EI = MFEI

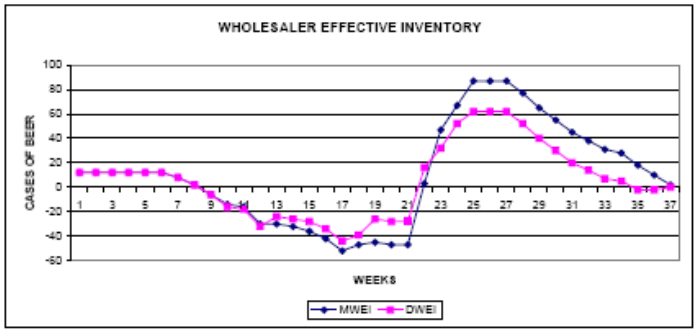
Stock:
St = MAX(0,EI)

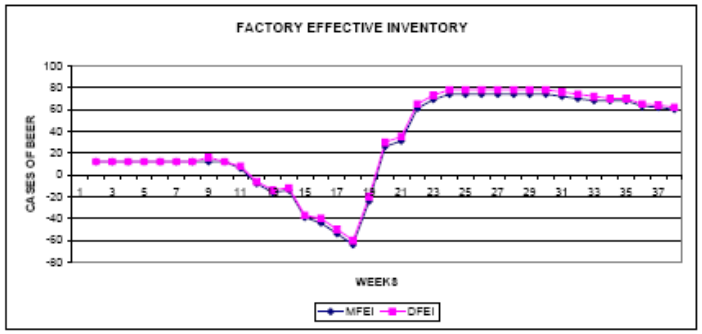
Supply Line:
SLt = FSL = FPD1+FPD2

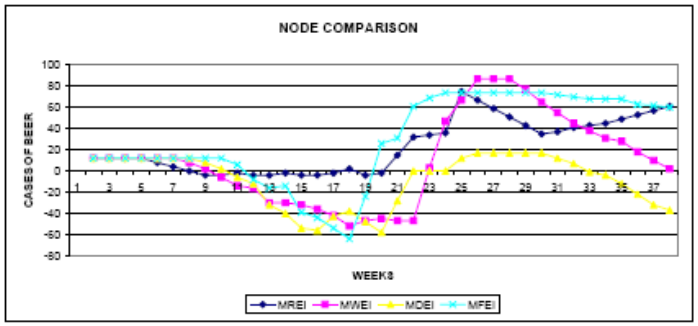
FROSTY 2 GAME MODEL WEEKS 21 TO 40

MODEL CHARTS



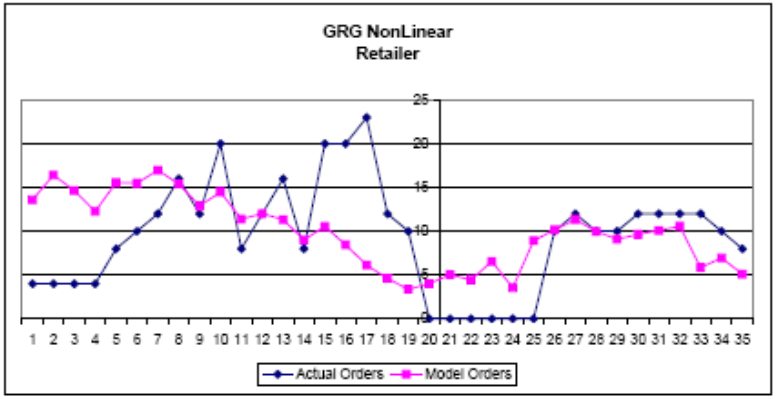


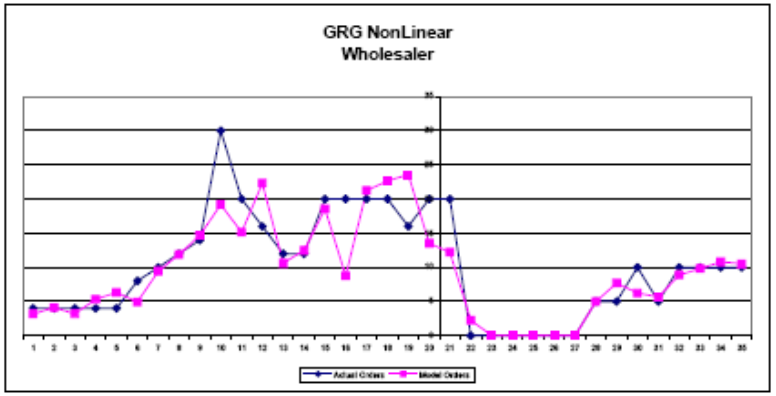


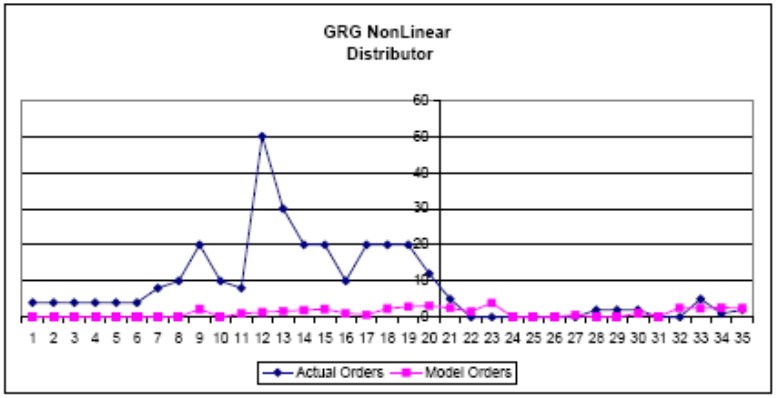


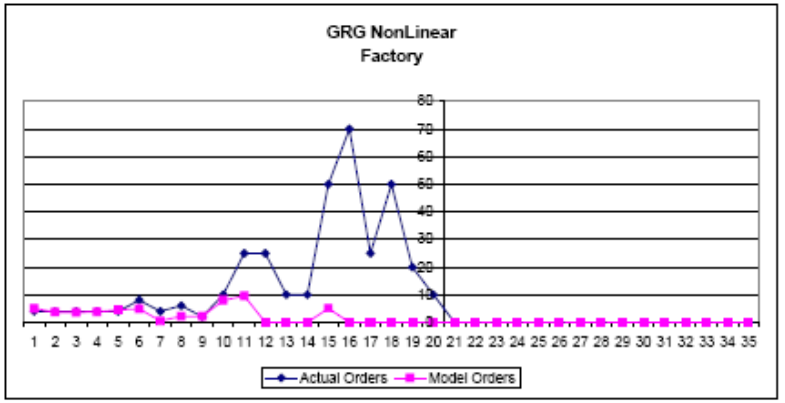
FROSTY 2 GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









FROSTY 2 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	FROSTY 2	IT							FROSTY 2	Retailer	IT					
	Team Costs	$ 3,243.00							Costs	$ 575.00						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	4	4	12		16	4
4	4	16	4	4	0	4	12	12	*13*	24	4	4	12		16	4
5	8	16	4	4	0	8	8	8	*8*	28	8	4	12		16	4
6	8	12	4	4	0	8	4	4	*4*	30	10	8	16		16	4
7	8	8	4	8	0	8	0	0	*0*	30	12	10	22		16	4
8	8	4	8	10	4	4	0	-4	*-4*	34	16	12	30		12	4
9	8	8	10	6	4	8	0	-4	*-4*	38	12	16	38		6	8
10	8	10	6	8	2	10	0	-2	*-2*	40	20	12	40		8	10
11	8	6	8	10	4	6	0	-4	*-4*	44	8	20	54		10	6
12	8	8	10	6	4	8	0	-4	*-4*	48	12	8	54		6	8
13	8	10	6	8	2	10	0	-2	*-2*	50	16	12	56		8	10
14	8	6	8	10	4	6	0	-4	*-4*	54	8	16	66		10	12
15	8	8	10	12	4	8	0	-4	*-4*	58	20	8	66		12	2
16	8	10	12	2	2	10	0	-2	*-2*	60	20	20	76		2	10
17	8	12	2	10	0	10	2	2	*0*	61	23	20	84		10	25
18	8	4	10	25	4	4	0	-4	*-2*	65	12	23	105		25	25
19	8	10	25	25	2	10	0	-2	*0*	67	10	12	107		25	10
20	8	25	25	10	0	10	15	15	*17*	74.5	0	10	92		10	10
21	8	40	10	10	0	8	32	32	*24*	90.5	0	0	67		10	50
22	8	42	10	47	0	8	34	34	*36*	107.5	0	0	57		50	44
23	8	44	47	0	0	8	36	36	*38*	125.5	0	0	47		47	20
24	8	83	0	0	0	8	75	75	*56*	163	0	0	0		67	20
25	8	75	0	0	0	8	67	67	*48*	196.5	0	0	0		87	0
26	8	67	0	0	0	8	59	59	*40*	226	10	0	0		87	0
27	8	59	0	0	0	8	51	51	*32*	251.5	12	10	10		87	0
28	8	51	0	10	0	8	43	43	*24*	273	10	12	22		87	0
29	8	43	10	12	0	8	35	35	*18*	290.5	10	10	32		77	0
30	8	45	12	10	0	8	37	37	*20*	309	12	10	32		65	0
31	8	49	10	10	0	8	41	41	*34*	329.5	12	12	32		55	5
32	8	51	10	12	0	8	43	43	*26*	351	12	12	34		50	5
33	8	53	12	12	0	8	45	45	*28*	373.5	12	12	36		43	9
34	8	57	12	12	0	8	49	49	*32*	398	10	12	36		40	2
35	8	61	12	12	0	8	53	53	*36*	424.5	8	10	34		30	2
36	8	65	12	10	0	8	57	57	*40*	453	6	8	30		20	0
37	8	69	10	8	0	8	61	61	*42*	483.5	6	6	24		10	0
38	8	71	8	2	0	8	63	63	*44*	515	10	6	20		2	5
39	8	71	2	5	0	8	63	63	*46*	546.5	10	10	22		5	1
40	8	65	5	1	0	8	57	57	*44*	575	10	10	30		1	2

FROSTY 2 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					FROSTY 2	Wholesaler		IT								FROSTY 2
					Costs	$ 881.50										Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	4	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	4	4	12		16	4	4	0	12	12	*13*
5	4	0	12	12	*12*	30	4	4	12		16	4	4	0	12	12	*8*
6	4	0	12	12	*12*	36	8	4	12		16	4	4	0	12	12	*4*
7	4	0	8	8	*8*	40	10	8	16		16	4	4	0	12	12	*0*
8	8	0	2	2	*2*	41	12	10	22		16	4	4	0	8	8	*-4*
9	10	6	0	-6	*-6*	47	14	12	30		12	4	8	0	2	2	*-4*
10	6	14	0	-14	*-16*	61	30	14	36		6	8	10	6	0	-6	*-2*
11	8	16	0	-16	*-18*	77	20	30	56		8	10	12	12	0	-12	*-4*
12	10	30	0	-30	*-32*	107	16	20	70		10	12	2	32	0	-32	*-4*
13	12	30	0	-30	*-24*	137	12	16	78		12	2	10	40	0	-40	*-2*
14	2	32	0	-32	*-26*	169	12	12	80		2	10	25	54	0	-54	*-4*
15	10	36	0	-36	*-28*	205	20	12	80		10	25	25	56	0	-56	*-4*
16	25	42	0	-42	*-34*	247	20	20	98		25	25	10	43	0	-43	*-2*
17	25	52	0	-52	*-44*	299	20	20	108		25	10	10	38	0	-38	*0*
18	10	47	0	-47	*-39*	346	20	20	103		10	10	50	48	0	-48	*-2*
19	10	45	0	-45	*-26*	391	16	20	98		10	50	44	58	0	-58	*0*
20	50	47	0	-47	*-28*	438	20	16	104		50	44	20	28	0	-28	*17*
21	44	47	0	-47	*-28*	485	20	20	114		44	20	20	0	0	0	*24*
22	20	0	3	3	*16*	486.5	0	20	84		20	20	12	0	0	0	*36*
23	20	0	47	47	*32*	510	0	0	40		20	12	5	0	0	0	*38*
24	0	0	67	67	*52*	543.5	0	0	20		12	5	0	0	12	12	*56*
25	0	0	87	87	*62*	587	0	0	0		17	0	0	0	17	17	*48*
26	0	0	87	87	*62*	630.5	0	0	0		17	0	0	0	17	17	*40*
27	0	0	87	87	*62*	674	0	0	0		17	0	0	0	17	17	*32*
28	0	0	77	77	*52*	712.5	5	0	0		17	0	0	0	17	17	*24*
29	0	0	65	65	*40*	745	5	5	5		17	0	0	0	17	17	*18*
30	5	0	55	55	*30*	772.5	10	5	10		17	0	2	0	12	12	*20*
31	5	0	45	45	*20*	795	5	10	20		12	2	2	0	7	7	*34*
32	9	0	38	38	*14*	814	10	5	20		9	2	2	1	0	-1	*26*
33	2	0	31	31	*7*	829.5	10	10	25		2	2	0	4	0	-4	*28*
34	2	0	28	28	*5*	843.5	10	10	26		2	0	0	12	0	-12	*32*
35	0	0	18	18	*-2*	852.5	10	10	34		0	0	5	22	0	-22	*36*
36	0	0	10	10	*-2*	857.5	10	10	42		0	5	1	32	0	-32	*40*
37	5	0	2	2	*0*	858.5	10	10	52		5	1	2	37	0	-37	*42*
38	1	4	0	-4	*13*	862.5	5	10	62		1	2	10	46	0	-46	*44*
39	2	5	0	-5	*12*	867.5	10	5	62		2	10	1	54	0	-54	*46*
40	10	14	0	-14	*3*	881.5	10	10	71		10	1	5	49	0	-49	*44*

FROSTY 2 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									FROSTY 2 Costs	Factory	IT		
	$ 777.00												$ 1,009.50			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	4	4	12		16	4	4	0	12	12	*12*	18	4	8	
4	24	4	4	12		16	4	4	0	12	12	*12*	24	4	8	
5	30	4	4	12		16	4	4	0	12	12	*12*	30	4	8	
6	36	4	4	12		16	4	4	0	12	12	*12*	36	8	8	
7	42	8	4	12		16	4	8	0	12	12	*12*	42	4	12	
8	46	10	8	16		16	8	4	0	12	12	*16*	48	6	12	
9	47	20	10	22		20	4	6	0	12	12	*12*	54	2	10	
10	53	10	20	38		16	6	2	0	6	6	*8*	57	10	8	
11	65	8	10	40		12	2	10	8	0	-8	*-6*	65	25	12	
12	97	50	8	38		2	10	25	16	0	-16	*-14*	81	25	35	
13	137	30	50	76		10	25	25	14	0	-14	*-12*	95	10	50	
14	191	20	30	104		25	25	10	39	0	-39	*-37*	134	10	35	
15	247	20	20	114		25	10	10	44	0	-44	*-40*	178	50	20	
16	290	10	20	109		10	10	50	54	0	-54	*-50*	232	70	60	
17	328	20	10	94		10	50	70	64	0	-64	*-60*	296	25	120	
18	376	20	20	104		50	70	25	24	0	-24	*-20*	320	50	95	
19	434	20	20	114		70	25	50	0	26	26	*30*	333	20	75	
20	462	12	20	84		51	50	20	0	31	31	*35*	348.5	10	70	
21	462	5	12	52		81	20	10	0	61	61	*65*	379	0	30	
22	462	0	5	37		81	10	0	0	69	69	*73*	413.5	0	10	
23	462	0	0	17		79	0	0	0	74	74	*78*	450.5	0	0	
24	468	0	0	5		74	0	0	0	74	74	*78*	487.5	0	0	
25	476.5	0	0	0		74	0	0	0	74	74	*78*	524.5	0	0	
26	485	0	0	0		74	0	0	0	74	74	*78*	561.5	0	0	
27	493.5	0	0	0		74	0	0	0	74	74	*78*	598.5	0	0	
28	502	2	0	0		74	0	0	0	74	74	*78*	635.5	0	0	
29	510.5	2	2	2		74	0	0	0	74	74	*78*	672.5	0	0	
30	516.5	2	2	4		74	0	0	0	72	72	*76*	708.5	0	0	
31	520	0	2	6		72	0	0	0	70	70	*74*	743.5	0	0	
32	521	0	0	4		70	0	0	0	68	68	*72*	777.5	0	0	
33	525	5	0	2		68	0	0	0	68	68	*70*	811.5	0	0	
34	537	1	5	5		68	0	0	0	68	68	*70*	845.5	0	0	
35	559	2	1	6		68	0	0	0	63	63	*65*	877	0	0	
36	591	10	2	8		63	0	0	0	62	62	*64*	908	0	0	
37	628	1	10	13		62	0	0	0	60	60	*62*	938	0	0	
38	674	5	1	13		60	0	0	0	50	50	*52*	963	0	0	
39	728	10	5	16		50	0	0	0	49	49	*42*	987.5	0	0	
40	777	0	10	16		49	0	0	0	44	44	*38*	1009.5	0	0	

FROSTY 2 GAME MODEL WEEKS 21 TO 40 MODEL DATA

FROSTY 2 IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	4	12	4	12	4	12	4	12
4	4	13	4	12	4	13	4	12
5	8	8	4	12	4	8	4	12
6	10	4	8	12	4	4	8	12
7	12	0	10	8	8	0	4	12
8	16	-4	12	2	10	-4	6	16
9	12	-4	14	-6	20	-4	2	12
10	20	-2	30	-16	10	-2	10	8
11	8	-4	20	-18	8	-4	25	-6
12	12	-4	16	-32	50	-4	25	-14
13	16	-2	12	-24	30	-2	10	-12
14	8	-4	12	-26	20	-4	10	-37
15	20	-4	20	-28	20	-4	50	-40
16	20	-2	20	-34	10	-2	70	-50
17	23	0	20	-44	20	0	25	-60
18	12	-2	20	-39	20	-2	50	-20
19	10	0	16	-26	20	0	20	30
20	0	17	20	-28	12	17	10	35
21	0	24	20	-28	5	24	0	65
22	0	36	0	16	0	36	0	73
23	0	38	0	32	0	38	0	78
24	0	56	0	52	0	56	0	78
25	0	48	0	62	0	48	0	78
26	10	40	0	62	0	40	0	78
27	12	32	0	62	0	32	0	78
28	10	24	5	52	2	24	0	78
29	10	18	5	40	2	18	0	78
30	12	20	10	30	2	20	0	76
31	12	34	5	20	0	34	0	74
32	12	26	10	14	0	26	0	72
33	12	28	10	7	5	28	0	70
34	10	32	10	5	1	32	0	70
35	8	36	10	-2	2	36	0	65
36	6	40	10	-2	10	40	0	64
37	6	42	10	0	1	42	0	62
38	10	44	5	13	5	44	0	52
39	10	46	10	12	10	46	0	42
40	10	44	10	3	0	44	0	38

GUINESS GAME MODEL WEEKS 21 TO 40

RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	-1.726543	2.511492	1.4885082	2.21566667	12	12	12
2	4	0.95	4	-0.432879	4.750462	-0.750462	0.56317831	12	12	12
3	4	1.67	8	0.620375	6.525606	1.4743943	2.17383861	12	12	12
4	4	2.22	6	-0.74721	5.708537	0.2914626	0.08495043	12	12	16
5	8	2.64	8	1.174774	8.243887	-0.243887	0.05948092	8	8	18
6	8	3.91	12	-0.987406	7.540484	4.4595165	19.8872873	4	4	22
7	8	4.87	8	-0.704352	8.790191	-0.790191	0.62440246	4	4	26
8	8	5.61	12	-1.726543	8.602788	3.3972116	11.5410463	2	2	28
9	8	6.18	20	-0.432879	10.45988	9.5401199	91.0138887	2	2	32
10	8	6.61	20	0.620375	12.03686	7.9631383	63.4115714	-4	0	50
11	8	6.94	24	-0.74721	10.99637	13.003629	169.094375	-2	0	60
12	8	7.19	20	1.174774	13.16851	6.833487	46.6965444	-2	0	76
13	8	7.38	4	-0.987406	11.19428	-7.19428	51.7576614	0	0	86
14	8	7.53	20	-0.704352	11.62349	8.3765066	70.1658625	-6	0	88
15	8	7.64	30	-1.726543	10.7097	19.290298	372.115611	-12	0	106
16	8	7.72	20	-0.432879	12.08493	7.9150741	62.6483978	-10	0	126
17	8	7.79	20	0.620375	13.2011	6.7988963	46.2249769	-10	0	138
18	8	7.84	20	-0.74721	11.87946	8.1205425	65.9432098	-18	0	158
19	8	7.88	20	1.174774	13.83638	6.1636202	37.9902136	-22	0	174
20	8	7.91	8	-0.987406	11.70522	-3.705224	13.7286816	0	0	164
21	8	7.93	20	1.35269	13.20369	6.7963139	46.189883	18	18	146
22	8	7.95	4	0.158703	11.5424	-7.542401	56.8878116	28	28	148
23	8	7.96	20	-1.09623	10.20721	9.7927852	95.8986428	30	30	142
24	8	7.97	4	-0.490169	10.72484	-6.724837	45.2234378	32	32	152
25	8	7.98	8	-0.278439	9.889103	-1.889103	3.56871025	54	54	126
26	8	7.98	8	-2.480618	6.876848	1.1231525	1.26147147	71	71	109
27	8	7.99	8	0.237886	8.064062	-0.064062	0.00410266	103	103	77
28	8	7.99	0	0.997854	6.283874	-6.283874	39.4870742	156	156	24
29	8	7.99	8	-0.825903	4.464248	3.5357518	12.501541	156	156	16
30	8	7.99	10	-0.62758	4.664532	5.3354675	28.4672137	156	156	16
31	8	8.00	10	-0.089445	5.203775	4.7962255	23.0037786	156	156	18
32	8	8.00	0	1.30872	6.986618	-6.986618	48.8128313	148	148	28
33	8	8.00	8	-1.008873	4.673462	3.3265385	11.0658583	148	148	20
34	8	8.00	8	-0.829273	4.755748	3.2442519	10.5251706	150	150	18
35	8	8.00	8	1.415342	6.904891	1.095109	1.19926375	152	152	16
36	9	8.00	8	-0.942674	4.931189	3.0688105	9.41759794	144	144	24
37	10	8.24	0	0.437282	6.547767	-6.547767	42.8732464	144	144	24
38	11	8.65	0	-1.075508	5.453565	-5.453565	29.741373	144	144	16
39	12	9.21	8	-0.269705	6.815729	1.184271	1.40249782	144	144	8
40	13	9.87	10	0.61173	8.357173	1.6428275	2.69888209	144	144	8
	mean of the disturbance			-0.284592		2.9139166	mean of the standard errors			
	std dev of the disturbance			1.009343						

Σ (AO-Ot)2	510.2304	constraints		
θ	0.24	>=0	<=1	
αs	0.05	>=0	<=1	
β	0.00	>=0	<=1	
S'	100.00	>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = COR

Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
AO = ROP

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$

Error Term:
$AO - O_t$

Squared errors:
$(AO - O_t)^2$

Effective Inventory:
EI = REI

Stock:
St = MAX(0,EI)

Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

GUINESS GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	1.339733	4	0.186134	52.54144	-48.54144	2356.27145	12	12	12
2	4	2.230745	4	0.800222	54.04654	-50.04654	2504.6562	12	12	12
3	4	2.823328	4	-0.205083	53.63382	-49.63382	2463.51583	12	12	12
4	8	3.217434	0	-1.30873	52.92428	-52.92428	2800.97919	12	12	12
5	6	4.819275	10	0.155652	60.76422	-50.76422	2577.00632	8	8	8
6	8	5.214739	8	-2.262056	59.58139	-51.58139	2660.64029	6	6	14
7	12	6.147616	10	0.147812	66.15042	-56.15042	3152.86938	2	2	18
8	8	8.107774	8	-0.511298	67.51716	-59.51716	3542.29216	-10	0	28
9	12	8.071677	10	-1.196649	67.18257	-57.18257	3269.8465	-8	0	26
10	20	9.387403	12	-0.669792	68.63829	-56.63829	3207.89631	-12	0	28
11	20	12.94192	20	-1.32655	71.14919	-51.14919	2616.23931	-22	0	30
12	24	15.3059	30	-1.382259	69.97571	-39.97571	1598.05765	-40	0	48
13	20	18.21785	30	1.440614	70.29447	-40.29447	1623.64442	-62	0	76
14	4	18.81475	20	0.769386	66.35153	-46.35153	2148.46456	-72	0	96
15	20	13.9528	30	0.080238	58.37926	-28.37926	805.382612	-68	0	108
16	30	15.9117	20	-0.926753	53.62826	-33.62826	1130.85963	-88	0	138
17	20	20.63034	50	-0.380626	55.79813	-5.798135	33.6183648	-114	0	154
18	20	20.41922	50	1.609193	53.70822	-3.708218	13.7508843	-104	0	174
19	20	20.27881	50	-0.511956	46.80432	3.195677	10.2123513	-98	0	198
20	20	20.18543	50	0.863095	41.89621	8.1037894	65.671402	-100	0	230
21	8	20.12332	50	0.780478	34.01426	15.985738	255.54381	-110	0	270
22	20	16.06282	25	-0.566104	20.86995	4.1300503	17.0573153	-108	0	310
23	4	17.38151	25	0.087964	23.80987	1.1901349	1.41642108	-98	0	305
24	20	12.8998	25	-0.126437	19.11355	5.8864494	34.6502865	-77	0	305
25	4	15.27776	0	1.363225	25.88283	-25.88283	669.921089	-57	0	290
26	8	11.50046	0	0.224102	1.30948	-1.30948	1.71473695	39	39	190
27	8	10.32804	0	-2.061184	0	0	0	71	71	150
28	8	9.548302	0	2.138502	0	0	0	143	143	70
29	0	9.029724	0	0.267141	0	0	0	205	205	0
30	8	6.005369	0	-0.028625	0	0	0	205	205	0
31	10	6.673437	5	0.729659	0	5	25	197	197	0
32	10	7.787614	5	0.397244	0	5	25	187	187	5
33	0	8.528816	5	-0.632539	0	5	25	177	177	10
34	8	5.672098	0	-0.982652	0	0	0	177	177	15
35	8	6.45179	0	-0.241681	0	0	0	174	174	10
36	8	6.970337	0	0.201845	0	0	0	171	171	5
37	8	7.315206	0	0.7376	0	0	0	168	168	0
38	0	7.544566	0	0.088193	0	0	0	160	160	0
39	0	5.01764	0	0.780478	0	0	0	160	160	0
40	8	3.337065	8	-0.767686	0	8	64	160	160	0
	mean of the disturbance			-0.093723		-21.59901	mean of the standard errors			
	std dev of the disturbance			1.003552						

Σ (AO-Ot)2	1119.304		constraints		
θ	0.33		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.19		>=0	<=1	
S'	65.34		>=0	<=100	

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

GUINESS GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	3.553338	4	-0.742927	7.439098	-3.439098	11.8273938	12	12	12
2	4	3.950123	4	-0.333851	8.244959	-4.244959	18.0196735	12	12	12
3	4	3.99443	8	-1.294753	7.328364	-1.328364	1.76455217	12	12	12
4	4	3.999378	4	1.056459	9.684524	-5.684524	32.3138142	12	12	14
5	0	3.999931	2	-0.833565	7.795053	-5.795053	33.5826365	12	12	14
6	10	0.448654	2	-1.049127	3.037909	-1.037909	1.07725538	16	16	12
7	8	8.93322	2	-1.431316	12.13059	-10.13059	102.628878	12	12	8
8	10	8.104209	10	1.706926	15.42813	-5.428127	29.46456	8	8	6
9	8	9.788305	20	1.774132	19.15604	0.8439607	0.71226973	0	0	14
10	10	8.199692	14	-0.34091	15.45238	-1.452384	2.10941929	-6	0	32
11	12	9.799968	4	-1.028328	16.36424	-12.36424	152.874463	-14	0	44
12	20	11.75422	10	0.157381	19.5052	-9.505204	90.3489008	-16	0	38
13	30	19.07923	20	1.712067	28.3849	-8.3849	70.3065469	-28	0	40
14	30	28.78053	35	2.361682	38.73581	-3.735811	13.9562805	-58	0	60
15	20	29.86383	20	0.714142	38.17157	-18.17157	330.205969	-84	0	91
16	30	21.10145	30	-0.188937	28.50611	1.4938851	2.2316927	-74	0	81
17	20	29.00634	40	-0.280303	36.31964	3.6803626	13.5450688	-78	0	85
18	50	21.0057	30	-1.161972	27.43733	2.5626727	6.5672916	-80	0	107
19	50	46.76234	60	-1.264687	53.09125	6.9087494	47.7308187	-120	0	127
20	50	49.63846	50	-1.668693	55.56337	-5.563374	30.9511277	-160	0	177
21	50	49.95963	80	-1.381374	56.17186	23.828143	567.780398	-180	0	197
22	50	49.99549	80	1.47735	59.06644	20.933556	438.213767	-205	0	252
23	25	49.9995	50	0.096884	57.68998	-7.689983	59.1358362	-215	0	292
24	25	27.79158	40	0.314213	35.6994	4.3006032	18.4951879	-140	0	242
25	25	25.31172	25	0.713301	33.61863	-8.618627	74.2807231	-125	0	242
26	0	25.03481	0	0.125281	32.75369	-32.75369	1072.80431	-70	0	187
27	0	2.795526	0	1.881675	0	0	0	50	50	67
28	0	0.312164	0	-0.913411	0	0	0	92	92	25
29	0	0.034858	0	-0.339273	0	0	0	117	117	0
30	0	0.003892	0	0.619881	0	0	0	117	117	0
31	0	0.000435	0	0.498311	0	0	0	117	117	0
32	5	4.85E-05	0	-0.499184	0	0	0	117	117	0
33	5	4.441678	0	-0.609734	0	0	0	112	112	0
34	5	4.937665	0	-0.669063	0	0	0	107	107	0
35	0	4.993038	0	0.076361	0	0	0	102	102	0
36	0	0.55755	0	0.041553	0	0	0	102	102	0
37	0	0.062259	0	-0.284538	0	0	0	102	102	0
38	0	0.006952	0	-1.306283	0	0	0	102	102	0
39	0	0.000776	0	-0.560467	0	0	0	102	102	0
40	0	8.67E-05	0	0.096884	0	0	0	102	102	0
	mean of the disturbance			-0.021296		-2.307899	mean of the standard errors			
	std dev of the disturbance			1.089136						

Σ (AO-Ot)2	2230.71		constraints		
θ	0.89		>=0	<=1	
αs	0.25		>=0	<=1	
β	0.00		>=0	<=1	
S'	30.73		>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

GUINESS GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTOR	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	1.961226	91.62994	-87.62994	7679.00696	12	12	8
2	4	4	4	-0.794495	88.87422	-84.87422	7203.63359	12	12	8
3	4	4	4	0.465763	90.13448	-86.13448	7419.1486	12	12	8
4	6	4	4	-0.356632	89.31209	-85.31209	7278.15187	12	12	8
5	4	6	6	-0.264452	93.40426	-87.40426	7639.50547	10	10	8
6	2	4	4	0.965167	92.05106	-88.05106	7752.98971	10	10	10
7	2	2	0	0.497056	87.58295	-87.58295	7670.77356	12	12	10
8	2	2	0	0.231265	85.06562	-85.06562	7236.16025	16	16	4
9	10	2	0	0.954292	84.95429	-84.95429	7217.23186	18	18	0
10	20	10	4	-1.485391	100.5146	-96.51461	9315.06981	8	8	0
11	14	20	30	-0.221777	118.6126	-88.61258	7852.18953	-12	0	4
12	4	14	30	1.088915	105.179	-75.17896	5651.87638	-26	0	34
13	10	4	14	0.029065	86.54444	-72.54444	5262.69625	-26	0	60
14	20	10	10	0.311315	97.48926	-87.48926	7654.37036	-6	0	44
15	35	20	10	-1.665327	107.3408	-97.34082	9475.23612	4	4	24
16	20	35	30	-0.141486	129.0303	-99.03031	9807.00158	-17	0	20
17	30	20	25	-0.650373	107.6932	-82.69321	6838.16735	-27	0	40
18	40	30	40	1.626151	115.5986	-75.59858	5715.14541	-47	0	55
19	30	40	100	1.158505	122.2168	-22.21683	493.587587	-57	0	65
20	60	30	40	-0.076085	89.12646	-49.12646	2413.40935	-82	0	140
21	50	60	80	1.809831	121.0124	-41.01238	1682.01529	-82	0	140
22	80	50	120	1.28194	116.3127	3.6873048	13.5962166	-32	0	120
23	80	80	200	-0.857502	120.8604	79.139576	6263.07247	-72	0	200
24	50	80	80	0.202863	86.95155	-6.951545	48.3239792	-72	0	320
25	40	50	40	1.252633	69.65773	-29.65773	879.580897	-2	0	280
26	25	40	0	-0.469414	0	0	0	158	158	120
27	0	25	0	-1.181192	0	0	0	213	213	40
28	0	0	0	-1.307803	0	0	0	253	253	0
29	0	0	0	-0.398107	0	0	0	253	253	0
30	0	0	0	0.747444	0	0	0	253	253	0
31	0	0	0	-2.049462	0	0	0	253	253	0
32	0	0	0	-0.406016	0	0	0	253	253	0
33	0	0	0	-2.071598	0	0	0	253	253	0
34	0	0	0	-0.550755	0	0	0	253	253	0
35	0	0	0	0.872101	0	0	0	253	253	0
36	0	0	0	-0.175904	0	0	0	253	253	0
37	0	0	0	0.044091	0	0	0	253	253	0
38	0	0	0	-1.269038	0	0	0	253	253	0
39	0	0	0	0.142556	0	0	0	253	253	0
40	0	0	0	-0.485815	0	0	0	253	253	0
	mean of the disturbance			0.014505		-46.23286	mean of the standard errors			
	std dev of the disturbance			1.068215						

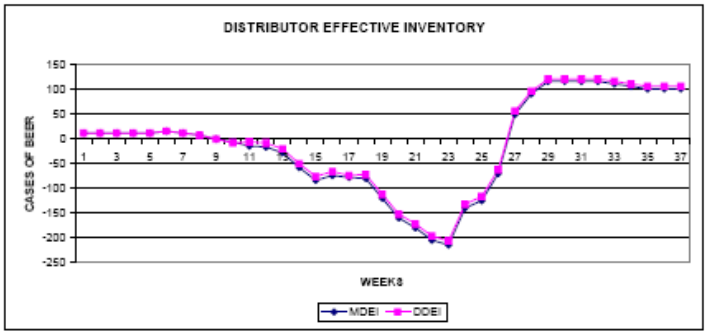
Σ (AO-Ot)2	8886.589		constraints	
θ	1.00		>=0	<=1
αs	1.00		>=0	<=1
β	0.29		>=0	<=1
S'	100.00		>=0	<=100

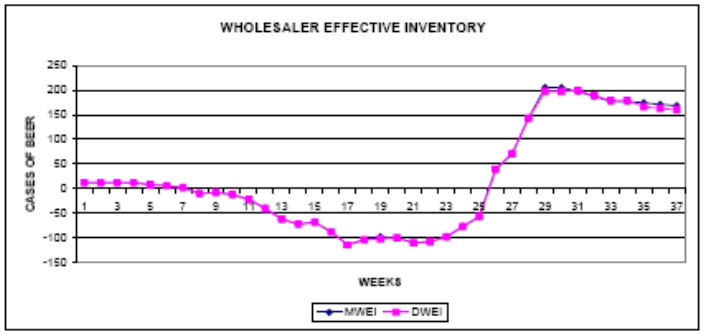
GRG NonLinear

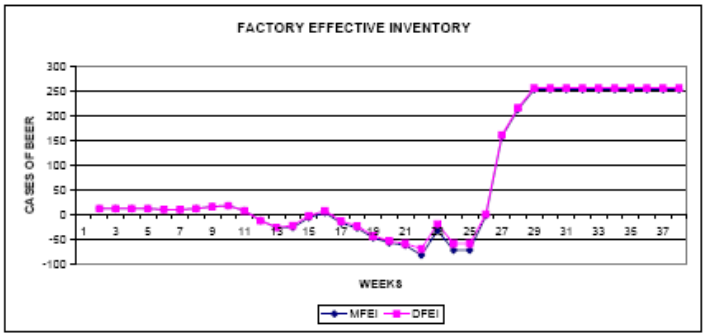
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

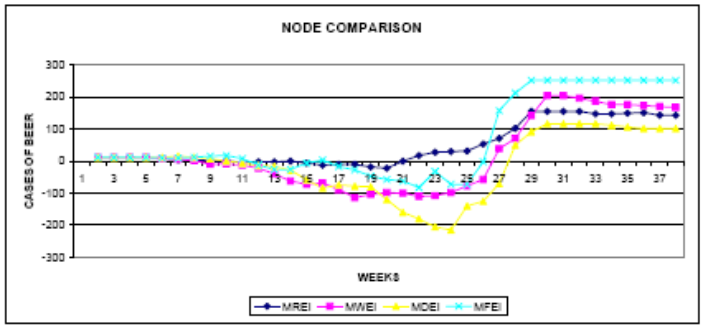
GUINESS GAME MODEL WEEKS 21 TO 40

MODEL CHARTS



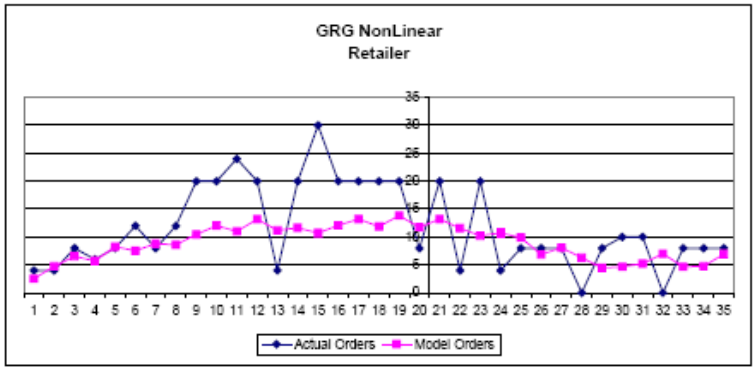


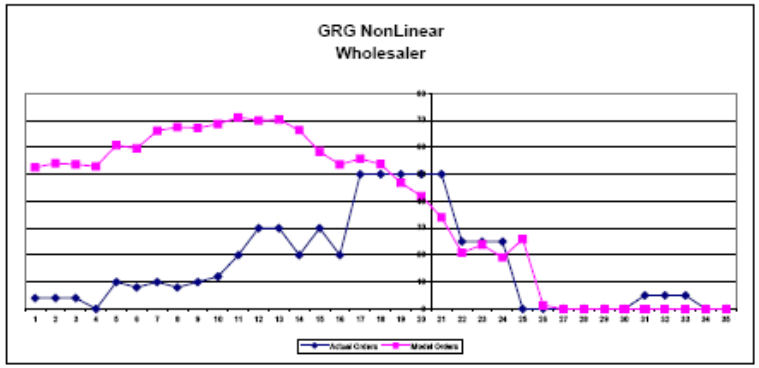


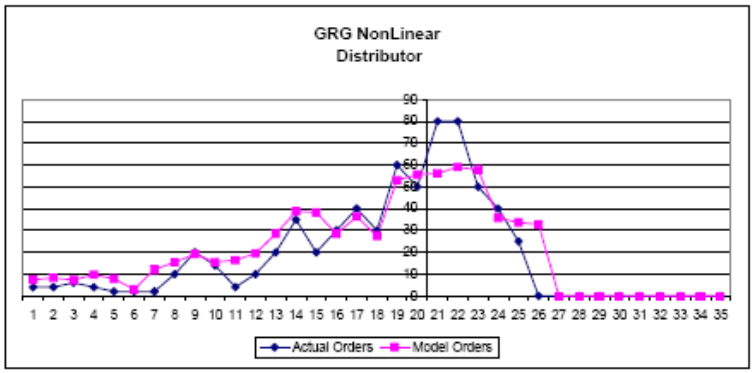


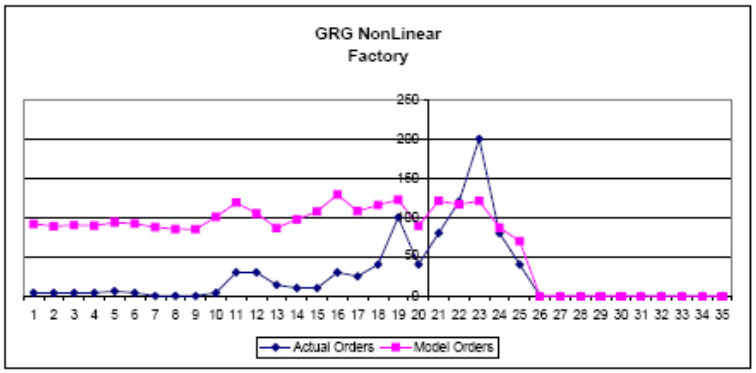
GUINESS GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









GUINESS GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	GUINESS	IT							GUINESS	Retailer	IT				
	Team Costs	$ 8,590.50							Costs	$ 1,259.00					
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	8	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	6	8	16		16	4
5	8	16	4	8	0	8	8	8	*8*	28	8	6	18		16	4
6	8	12	8	6	0	8	4	4	*4*	30	12	8	22		12	4
7	8	12	6	8	0	8	4	4	*4*	32	8	12	26		10	0
8	8	10	8	2	0	8	2	2	*2*	33	12	8	28		2	10
9	8	10	2	10	0	8	2	2	*2*	34	20	12	32		10	8
10	8	4	10	8	4	4	0	-4	*-6*	38	20	20	50		8	10
11	8	10	8	10	2	10	0	-2	*-4*	40	24	20	60		10	2
12	8	8	10	2	2	8	0	-2	*-4*	42	20	24	76		2	2
13	8	10	2	2	0	10	0	0	*-2*	42	4	20	86		2	10
14	8	2	2	10	6	2	0	-6	*-8*	48	20	4	88		10	8
15	8	2	10	8	12	2	0	-12	*-14*	60	30	20	106		8	0
16	8	10	8	0	10	10	0	-10	*-12*	70	20	30	126		0	4
17	8	8	0	4	10	8	0	-10	*-12*	80	20	20	138		4	30
18	8	0	4	30	18	0	0	-18	*-20*	98	20	20	158		30	26
19	8	4	30	26	22	4	0	-22	*-24*	120	20	20	174		26	18
20	8	30	26	18	0	30	0	0	*-2*	120	8	20	164		18	10
21	8	26	18	10	0	8	18	18	*10*	129	20	8	146		10	10
22	8	36	10	10	0	8	28	28	*24*	143	4	20	148		10	30
23	8	38	10	30	0	8	30	30	*18*	158	20	4	142		30	25
24	8	40	30	25	0	8	32	32	*20*	174	4	20	152		25	40
25	8	62	25	40	0	8	54	54	*42*	201	8	4	126		40	100
26	8	79	40	61	0	8	71	71	*59*	236.5	8	8	109		100	40
27	8	111	61	8	0	8	103	103	*91*	288	8	8	77		79	80
28	8	164	8	8	0	8	156	156	*144*	366	0	8	24		151	70
29	8	164	8	8	0	8	156	156	*152*	444	8	0	16		213	0
30	8	164	8	0	0	8	156	156	*144*	522	10	8	16		205	0
31	8	164	0	8	0	8	156	156	*144*	600	10	10	18		205	0
32	8	156	8	10	0	8	148	148	*136*	674	0	10	28		197	0
33	8	156	10	10	0	8	148	148	*136*	748	8	0	20		187	0
34	8	158	10	0	0	8	150	150	*138*	823	8	8	18		177	5
35	8	160	0	8	0	8	152	152	*140*	899	8	8	16		182	5
36	8	152	8	8	0	8	144	144	*132*	971	8	8	24		179	5
37	8	152	8	8	0	8	144	144	*142*	1043	0	8	24		176	0
38	8	152	8	8	0	8	144	144	*132*	1115	0	0	16		168	0
39	8	152	8	0	0	8	144	144	*132*	1187	8	0	8		160	0
40	8	152	0	0	0	8	144	144	*132*	1259	10	8	8		160	0

GUINESS GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

	STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews						
					GUINESS Costs	Wholesaler $ 2,477.00		IT									GUINESS Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	4	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	0	4	12		16	4	4	0	12	12	*12*
5	4	0	8	8	*8*	28	10	0	8		16	4	6	0	12	12	*12*
6	0	0	6	6	*6*	31	8	10	14		16	6	4	0	16	16	*16*
7	10	0	2	2	*2*	32	10	8	18		22	4	2	0	12	12	*12*
8	8	10	0	-10	*-10*	42	8	10	28		16	2	2	0	8	8	*8*
9	10	8	0	-8	*-8*	50	10	8	26		10	2	2	0	0	0	*0*
10	2	12	0	-12	*-12*	62	12	10	28		2	2	10	6	0	-6	*-8*
11	2	22	0	-22	*-22*	84	20	12	30		2	10	8	14	0	-14	*-6*
12	10	40	0	-40	*-40*	124	30	20	48		10	8	0	16	0	-16	*-8*
13	8	62	0	-62	*-62*	186	30	30	76		8	0	4	28	0	-28	*-20*
14	0	72	0	-72	*-72*	258	20	30	96		0	4	30	58	0	-58	*-50*
15	4	68	0	-68	*-68*	326	30	20	108		4	30	26	84	0	-84	*-76*
16	30	88	0	-88	*-88*	414	20	30	138		30	26	18	74	0	-74	*-66*
17	26	114	0	-114	*-114*	528	50	20	154		26	18	10	78	0	-78	*-74*
18	18	104	0	-104	*-104*	632	50	50	174		18	10	10	80	0	-80	*-72*
19	10	98	0	-98	*-102*	730	50	50	198		10	10	30	120	0	-120	*-112*
20	10	100	0	-100	*-100*	830	50	50	230		10	30	25	160	0	-160	*-152*
21	30	110	0	-110	*-110*	940	50	50	270		30	25	40	180	0	-180	*-172*
22	25	108	0	-108	*-108*	1048	25	50	310		25	40	100	205	0	-205	*-197*
23	40	98	0	-98	*-98*	1146	25	25	305		40	100	40	215	0	-215	*-207*
24	100	77	0	-77	*-77*	1223	25	25	305		100	40	80	140	0	-140	*-132*
25	40	57	0	-57	*-57*	1280	0	25	290		40	80	120	125	0	-125	*-117*
26	80	0	39	39	*39*	1299.5	0	0	190		80	120	42	70	0	-70	*-62*
27	70	0	71	71	*71*	1335	0	0	150		120	42	25	0	50	50	*57*
28	0	0	143	143	*143*	1406.5	0	0	70		92	25	0	0	92	92	*97*
29	0	0	205	205	*197*	1509	0	0	0		117	0	0	0	117	117	*122*
30	0	0	205	205	*197*	1611.5	0	0	0		117	0	0	0	117	117	*122*
31	0	0	197	197	*199*	1710	5	0	0		117	0	0	0	117	117	*122*
32	0	0	187	187	*189*	1803.5	5	5	5		117	0	0	0	117	117	*122*
33	5	0	177	177	*179*	1892	5	5	10		117	0	0	0	112	112	*117*
34	5	0	177	177	*179*	1980.5	0	5	15		112	0	0	0	107	107	*112*
35	5	0	174	174	*166*	2067.5	0	0	10		107	0	0	0	102	102	*107*
36	0	0	171	171	*163*	2153	0	0	5		102	0	0	0	102	102	*107*
37	0	0	168	168	*160*	2237	0	0	0		102	0	0	0	102	102	*107*
38	0	0	160	160	*152*	2317	0	0	0		102	0	0	0	102	102	*107*
39	0	0	160	160	*152*	2397	0	0	0		102	0	0	0	102	102	*107*
40	0	0	160	160	*152*	2477	8	0	0		102	0	0	0	102	102	*107*

GUINESS GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									GUINESS	Factory	IT	
	$ 2,421.50											Costs	$ 2,433.00		
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL
0	0	4	4	12		12	4	4	0	12			0	4	8
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8
3	18	6	4	12		16	4	4	0	12	12	*12*	18	4	8
4	24	4	6	14		16	4	4	0	12	12	*12*	24	4	8
5	30	2	4	14		16	4	4	0	10	10	*10*	29	6	8
6	38	2	2	12		14	4	6	0	10	10	*10*	34	4	10
7	44	2	2	8		14	6	4	0	12	12	*12*	40	0	10
8	48	10	2	6		18	4	0	0	16	16	*16*	48	0	4
9	48	20	10	14		20	0	0	0	18	18	*18*	57	0	0
10	54	14	20	32		18	0	0	0	8	8	*8*	61	4	0
11	68	4	14	44		8	0	4	12	0	-12	*-12*	73	30	4
12	84	10	4	38		0	4	30	26	0	-26	*-26*	99	30	34
13	112	20	10	40		4	30	30	26	0	-26	*-22*	125	14	60
14	170	35	20	60		30	30	14	6	0	-8	*-2*	131	10	44
15	254	20	35	91		30	14	10	0	4	4	*8*	133	10	24
16	328	30	20	81		18	10	10	17	0	-17	*-13*	150	30	20
17	406	40	30	85		10	10	30	27	0	-27	*-23*	177	25	40
18	486	30	40	107		10	30	25	47	0	-47	*-43*	224	40	55
19	606	60	30	127		30	25	40	57	0	-57	*-53*	281	100	65
20	786	50	60	177		25	40	100	62	0	-62	*-59*	343	40	140
21	946	80	50	197		40	100	40	82	0	-82	*-69*	425	80	140
22	1151	80	80	252		100	40	80	32	0	-32	*-19*	457	120	120
23	1366	50	80	292		40	80	120	72	0	-72	*-59*	529	200	200
24	1506	40	50	242		80	120	200	72	0	-72	*-59*	601	80	320
25	1631	25	40	242		120	200	80	2	0	-2	*1*	603	40	280
26	1701	0	25	187		200	80	40	0	158	158	*161*	682	0	120
27	1726	0	0	67		238	40	0	0	213	213	*216*	788.5	0	40
28	1772	0	0	25		253	0	0	0	253	253	*256*	915	0	0
29	1830.5	0	0	0		253	0	0	0	253	253	*256*	1041.5	0	0
30	1889	0	0	0		253	0	0	0	253	253	*256*	1168	0	0
31	1947.5	0	0	0		253	0	0	0	253	253	*256*	1294.5	0	0
32	2006	0	0	0		253	0	0	0	253	253	*256*	1421	0	0
33	2062	0	0	0		253	0	0	0	253	253	*256*	1547.5	0	0
34	2115.5	0	0	0		253	0	0	0	253	253	*256*	1674	0	0
35	2166.5	0	0	0		253	0	0	0	253	253	*256*	1800.5	0	0
36	2217.5	0	0	0		253	0	0	0	253	253	*256*	1927	0	0
37	2268.5	0	0	0		253	0	0	0	253	253	*256*	2053.5	0	0
38	2319.5	0	0	0		253	0	0	0	253	253	*256*	2180	0	0
39	2370.5	0	0	0		253	0	0	0	253	253	*256*	2306.5	0	0
40	2421.5	0	0	0		253	0	0	0	253	253	*256*	2433	0	0

GUINESS GAME MODEL WEEKS 21 TO 40 MODEL DATA

GUINESS IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	8	12	4	12	6	12	4	12
4	6	12	0	12	4	12	4	12
5	8	8	10	8	2	12	6	10
6	12	4	8	6	2	16	4	10
7	8	4	10	2	2	12	0	12
8	12	2	8	-10	10	8	0	16
9	20	2	10	-8	20	0	0	18
10	20	-6	12	-12	14	-8	4	8
11	24	-4	20	-22	4	-6	30	-12
12	20	-4	30	-40	10	-8	30	-26
13	4	-2	30	-62	20	-20	14	-22
14	20	-8	20	-72	35	-50	10	-2
15	30	-14	30	-68	20	-76	10	8
16	20	-12	20	-88	30	-66	30	-13
17	20	-12	50	-114	40	-74	25	-23
18	20	-20	50	-104	30	-72	40	-43
19	20	-24	50	-102	60	-112	100	-53
20	8	-2	50	-100	50	-152	40	-59
21	20	10	50	-110	80	-172	80	-69
22	4	24	25	-108	80	-197	120	-19
23	20	18	25	-98	50	-207	200	-59
24	4	20	25	-77	40	-132	80	-59
25	8	42	0	-57	25	-117	40	1
26	8	59	0	39	0	-62	0	161
27	8	91	0	71	0	57	0	216
28	0	144	0	143	0	97	0	256
29	8	152	0	197	0	122	0	256
30	10	144	0	197	0	122	0	256
31	10	144	5	199	0	122	0	256
32	0	136	5	189	0	122	0	256
33	8	136	5	179	0	117	0	256
34	8	138	0	179	0	112	0	256
35	8	140	0	166	0	107	0	256
36	8	132	0	163	0	107	0	256
37	0	142	0	160	0	107	0	256
38	0	132	0	152	0	107	0	256
39	8	132	0	152	0	107	0	256
40	10	132	8	152	0	107	0	256

GUINESS 2 GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	-0.377139	0	4	16	12	12	12
2	4	4.00	4	1.84329	4.150813	-0.150813	0.02274462	12	12	12
3	4	4.00	8	-0.04735	2.260172	5.7398276	32.9456206	12	12	12
4	4	4.00	6	0.219214	1.997068	4.0029318	16.0234626	12	12	16
5	8	4.00	6	-1.358129	2.539258	3.4607418	11.9767336	8	8	18
6	8	8.00	8	0.361457	10.37838	-2.378377	5.65667687	4	4	20
7	8	8.00	6	-0.693092	9.323827	-3.323827	11.0478292	4	4	20
8	8	8.00	8	-0.377139	10.83196	-2.831964	8.02002138	2	2	20
9	8	8.00	10	1.84329	13.97974	-3.979743	15.8383575	0	0	22
10	8	8.00	8	-0.04735	11.82427	-3.824268	14.6250281	0	0	24
11	8	8.00	8	0.219214	11.826	-3.825998	14.6382641	-2	0	26
12	8	8.00	10	-1.358129	10.24866	-0.248665	0.06182956	-2	0	28
13	8	8.00	10	0.361457	11.96824	-1.968241	3.87397366	0	0	28
14	8	8.00	6	-0.693092	10.64886	-4.648858	21.6118762	0	0	28
15	8	8.00	8	-0.377139	11.22964	-3.229645	10.4306063	0	0	28
16	8	8.00	6	1.84329	13.45007	-7.450075	55.5036142	0	0	28
17	8	8.00	6	-0.04735	11.16218	-5.162183	26.6481286	-5	0	29
18	8	8.00	12	0.219214	11.16391	0.8360873	0.69904201	-9	0	31
19	8	8.00	12	-1.358129	8.792067	3.2079332	10.2908356	-11	0	37
20	8	8.00	14	0.361457	10.9089	3.091096	9.55487434	-4	0	34
21	8	8.00	14	1.482126	11.4999	2.5000954	6.2504771	-2	0	38
22	8	8.00	12	0.378945	8.939705	3.060295	9.36540526	2	2	40
23	8	8.00	6	-1.017305	5.159088	0.8409122	0.70713334	6	6	40
24	8	8.00	4	0.56634	5.152869	-1.152869	1.32910712	10	10	34
25	8	8.00	4	-2.038319	4.005228	-0.005228	2.7328E-05	8	8	32
26	8	8.00	4	1.233892	8.734457	-4.734457	22.41508	6	6	30
27	8	8.00	4	-1.305305	5.797579	-1.797579	3.23129171	8	8	24
28	8	8.00	6	1.482126	5.868956	0.1310437	0.01717246	15	15	13
29	8	8.00	8	0.378945	6.421633	1.5783671	2.49124258	12	12	14
30	8	8.00	10	-1.017305	6.880082	3.1199184	9.73389099	8	8	18
31	8	8.00	10	0.56634	10.05359	-0.053592	0.00287205	4	4	24
32	8	8.00	10	-2.038319	8.111447	1.8885529	3.56663201	2	2	28
33	8	8.00	8	1.233892	11.11882	-3.118824	9.72706264	2	2	30
34	8	8.00	8	-1.305305	9.37456	-1.37456	1.88941384	-1	0	33
35	8	8.00	8	1.482126	11.89716	-3.897156	15.1878253	-3	0	35
36	9	8.00	10	0.378945	10.79397	-0.793974	0.63039541	-3	0	35
37	10	9.00	11	-1.017305	10.00047	0.999527	0.99905427	-4	0	38
38	11	10.00	14	0.56634	12.71654	1.2834643	1.6472805	0	0	37
39	12	11.00	14	-0.125529	11.17083	2.8291732	8.00422119	-8	0	51
40	13	12.00	8	-1.139309	9.303206	-1.303206	1.69834668	-16	0	65
	mean of the disturbance			0.017735		-0.619975	mean of the standard errors			
	std dev of the disturbance			1.111394						

Σ (AO-Ot)2	98.89393		constraints	
θ	1.00		>=0	<=1
αs	0.60		>=0	<=1
β	0.22		>=0	<=1
S'	11.83		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

GUINESS 2 GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	-1.054733	2.718675	1.2813252	1.64179421	12	12	12
2	4	4	4	-0.787157	2.986251	1.0137491	1.02768729	12	12	12
3	4	4	5	0.075879	3.849288	1.1507124	1.32413897	12	12	12
4	8	4	10	-0.679483	3.021736	6.9782639	48.6961677	12	12	13
5	6	8	8	-0.211001	7.473622	0.5263781	0.2770739	8	8	19
6	6	6	10	-0.881313	4.722822	5.2771777	27.8486048	6	6	23
7	8	6	8	0.796118	6.143442	1.8565582	3.44680836	5	5	28
8	6	8	7	0.375696	7.659129	-0.659129	0.43445042	7	7	26
9	8	6	5	-0.510413	4.63694	0.3630603	0.13181282	9	9	25
10	10	8	3	-0.903157	6.396872	-3.396872	11.5387394	11	11	20
11	8	10	3	-0.390416	9.478828	-6.478828	41.975216	9	9	15
12	8	8	4	-1.455542	6.806594	-2.806594	7.87696909	8	8	11
13	10	8	6	-1.046167	7.600562	-1.600562	2.56179981	5	5	10
14	10	10	15	0.209507	11.16034	3.8396584	14.7429763	-2	0	13
15	6	10	10	-0.435886	9.648679	0.3513212	0.1234266	-9	0	25
16	8	6	15	-0.071474	5.579955	9.4200449	88.7372464	-11	0	31
17	6	8	15	-1.685077	5.31665	9.68335	93.7672666	-13	0	40
18	6	6	6	-1.618044	3.383683	2.616317	6.84511471	-4	0	40
19	12	6	6	-0.28539	5.005094	0.9949063	0.98983857	0	0	36
20	12	12	6	0.015201	11.64298	-5.642984	31.8432632	3	3	27
21	14	12	10	0.393319	12.3584	-2.3584	5.5620502	6	6	18
22	14	14	15	0.185053	14.48618	0.5138152	0.26400607	-2	0	22
23	12	14	10	0.642637	14.29407	-4.294066	18.4390037	-10	0	31
24	6	12	5	0.262851	11.62552	-6.625523	43.8975579	-16	0	35
25	4	6	5	-0.188662	5.534956	-0.534956	0.28617841	-12	0	30
26	4	4	5	0.400794	4.846304	0.1536959	0.02362239	-1	0	20
27	4	4	2	-0.920576	3.365207	-1.365207	1.86379064	5	5	15
28	4	4	5	-0.73976	3.658456	1.3415438	1.7997397	6	6	12
29	6	4	6	0.56928	4.863362	1.1366383	1.2919466	7	7	12
30	8	6	8	0.802994	7.129021	0.8709794	0.75860504	6	6	13
31	10	8	7	-0.479404	8.038295	-1.038295	1.07805706	0	0	19
32	10	10	20	0.009019	10.38234	9.6176598	92.4993793	-5	0	21
33	10	10	5	-0.583678	8.779095	-3.779095	14.2815564	-9	0	35
34	8	10	4	-0.912446	8.666795	-4.666795	21.7789719	-11	0	32
35	8	8	7	-0.372893	7.422914	-0.422914	0.17885664	-12	0	29
36	8	8	10	-0.726052	7.430701	2.5692988	6.60129648	-8	0	24
37	10	8	7	-1.143543	6.291319	0.7086812	0.50222907	-16	0	34
38	11	10	10	-0.31332	8.616217	1.3837828	1.91485496	-26	0	41
39	14	11	20	-1.340909	8.227682	11.772318	138.587466	-32	0	46
40	14	14	8	-0.24941	12.96888	-4.968884	24.6898071	-17	0	37
	mean of the disturbance			-0.327835		0.3804838	mean of the standard errors			
	std dev of the disturbance			0.664807						

Σ (AO-Ot)2	376.299		constraints		
θ	1.00		>=0	<=1	
αs	0.10		>=0	<=1	
β	0.69		>=0	<=1	
S'	18.14		>=0	<=100	

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

GUINESS 2 GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	1.180127	4.910121	-0.910121	0.82831998	12	12	12
2	4	4	4	2.485235	6.215229	-2.215229	4.90723817	12	12	12
3	4	4	12	-0.025093	3.704901	8.2950988	68.8086647	12	12	12
4	5	4	12	-0.785608	2.087727	9.9122725	98.2531468	12	12	20
5	10	5	8	-1.234491	2.727957	5.272043	27.7944376	11	11	28
6	8	10	20	-1.216638	12.99211	7.0078939	49.1105766	5	5	32
7	10	8	5	1.341069	8.910071	-3.910071	15.2886582	9	9	40
8	8	10	20	1.180127	12.96192	7.0380817	49.5345941	7	7	37
9	7	8	30	2.485235	14.33679	15.663207	245.336047	3	3	53
10	5	7	10	-0.025093	0	10	100	16	16	63
11	3	5	10	-0.785608	0	10	100	24	24	60
12	3	3	10	-1.234491	0	10	100	41	41	50
13	4	3	10	-1.216638	0	10	100	65	65	33
14	6	4	2	1.341069	0	2	4	71	71	33
15	15	6	5	1.180127	0	5	25	78	78	22
16	10	15	20	2.485235	0	20	400	73	73	17
17	15	10	0	-0.025093	0	0	0	73	73	27
18	15	15	10	-0.785608	0	10	100	60	60	25
19	6	15	0	-1.234491	0	0	0	50	50	30
20	6	6	5	-1.216638	0	5	25	64	64	10
21	6	6	10	0.708571	0	10	100	58	58	15
22	10	6	5	1.181613	0	5	25	62	62	15
23	15	10	2	-0.643187	0	2	4	52	52	20
24	10	15	2	0.84053	0	2	4	42	42	17
25	5	10	4	-0.555194	0	4	16	42	42	9
26	5	5	0	-1.254399	0	0	0	42	42	8
27	5	5	0	0.40559	0	0	0	39	39	6
28	2	5	0	0.708571	0	0	0	36	36	4
29	5	2	0	1.181613	0	0	0	38	38	0
30	6	5	0	-0.643187	0	0	0	33	33	0
31	8	6	0	0.84053	0	0	0	27	27	0
32	7	8	0	-0.555194	1.839391	-1.839391	3.3833591	19	19	0
33	20	7	5	-1.254399	6.760582	-1.760582	3.09965054	12	12	0
34	5	20	35	0.40559	32.23441	2.7655894	7.6484849	-8	0	5
35	4	5	5	0.708571	13.78951	-8.789512	77.2555127	-13	0	40
36	7	4	10	0.838155	12.38368	-2.383684	5.68194894	-17	0	45
37	10	7	10	0.639697	14.64981	-4.649815	21.6207756	-19	0	50
38	7	10	10	1.263983	15.27653	-5.276532	27.8417947	6	6	25
39	10	7	20	0.835433	13.20411	6.7958874	46.1840849	4	4	30
40	20	10	30	0.563514	14.86137	15.138629	229.178101	4	4	40
	mean of the disturbance			0.170524		4.0436937	mean of the standard errors			
	std dev of the disturbance			1.173029						

Σ (AO-Ot)2	570.8937		constraints		
θ	1.00		>=0	<=1	
αs	0.95		>=0	<=1	
β	0.11		>=0	<=1	
S'	13.07		>=0	<=100	
	GRG NonLinear				

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

GUINESS 2 GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTOR	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	1.710944	4	-0.474704	12.44807	-8.448074	71.3699493	12	12	8
2	4	2.690056	4	-0.97438	12.92751	-8.92751	79.7004313	12	12	8
3	4	3.250366	4	1.144611	15.60681	-11.60681	134.718051	12	12	8
4	12	3.571011	4	-1.230584	13.55225	-9.552251	91.2455003	12	12	8
5	12	7.176393	20	0.323347	26.71157	-6.711574	45.0452321	4	4	8
6	8	9.239623	30	-1.347918	19.48821	10.51179	110.49773	-4	0	24
7	20	8.709392	10	0.223617	1.654603	8.3453967	69.6456464	-8	0	50
8	5	13.53879	20	-0.379824	13.14014	6.8598576	47.0576466	-8	0	40
9	20	9.886443	10	-1.498409	0	10	100	17	17	30
10	30	14.21238	20	-1.418164	13.03497	6.9650323	48.5116748	7	7	30
11	10	20.96531	50	1.419509	29.62558	20.374425	415.117181	-3	0	30
12	10	16.27505	20	0.637242	0	20	400	-3	0	70
13	10	13.59099	10	0.090726	0	10	100	7	7	70
14	10	12.05499	10	1.5794	0	10	100	47	47	30
15	2	11.176	5	-1.08871	0	5	25	57	57	20
16	5	7.251094	0	0.357488	0	0	0	65	65	15
17	20	6.28822	0	-0.75552	0	0	0	70	70	5
18	0	12.15324	30	-0.018447	0	30	900	55	55	0
19	10	6.954863	0	0.027303	0	0	0	55	55	30
20	0	8.257378	0	-0.369151	0	0	0	45	45	30
21	5	4.7254	15	-1.983509	0	15	225	75	75	0
22	10	4.842856	5	-2.674199	0	5	25	70	70	15
23	5	7.048752	0	0.48609	0	0	0	60	60	20
24	2	6.172427	0	0.439317	0	0	0	70	70	5
25	2	4.38773	0	-0.716802	0	0	0	73	73	0
26	4	3.366412	0	-0.654872	0	0	0	71	71	0
27	0	3.63742	0	-1.370876	0	0	0	67	67	0
28	0	2.081565	0	1.489618	0	0	0	67	67	0
29	0	1.191205	0	-1.048894	0	0	0	67	67	0
30	0	0.681684	0	-0.11137	0	0	0	67	67	0
31	0	0.390103	0	0.439317	0	0	0	67	67	0
32	0	0.223242	0	-0.716802	0	0	0	67	67	0
33	0	0.127753	0	-0.654872	0	0	0	67	67	0
34	5	0.073109	0	-1.370876	0	0	0	67	67	0
35	35	2.180517	10	1.489618	0	10	100	62	62	0
36	5	16.21859	10	-1.048894	9.929615	0.0703854	0.00495411	27	27	10
37	10	11.42	5	-0.11137	3.808963	1.1910367	1.41856848	22	22	20
38	10	10.81261	5	0.439317	7.382057	-2.382057	5.67419603	22	22	15
39	10	10.46503	5	-0.716802	9.508145	-4.508145	20.3233735	22	22	10
40	20	10.26812	20	-0.654872	14.37117	5.6288344	31.6837763	17	17	10
	mean of the disturbance			-0.306048		3.5088652	mean of the standard errors			
	std dev of the disturbance			1.042346						

Σ (AO-Ot)2	409.1049		constraints		
θ	0.43		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.73		>=0	<=1	
S'	29.02		>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = FIO

Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
AO = FPR

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$

Error Term:
$AO - O_t$

Squared errors:
$(AO - O_t)^2$

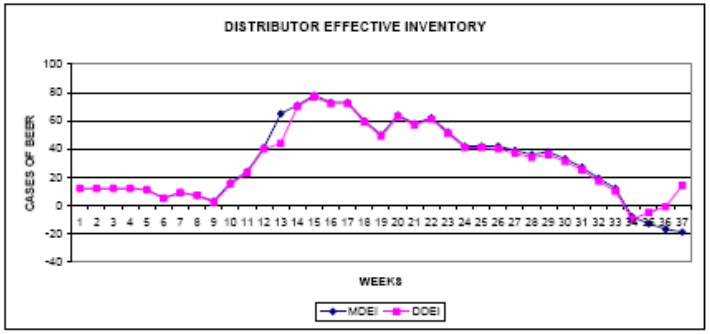
Effective Inventory:
EI = MFEI

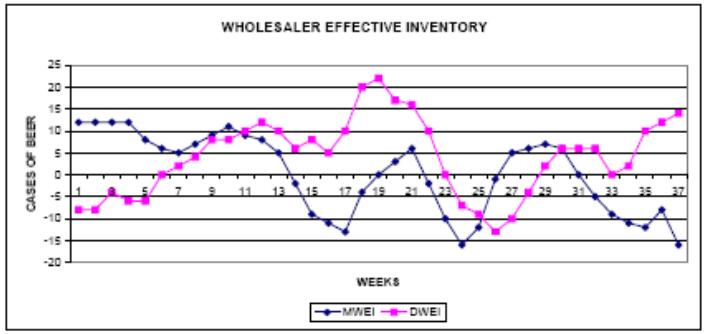
Stock:
St = MAX(0,EI)

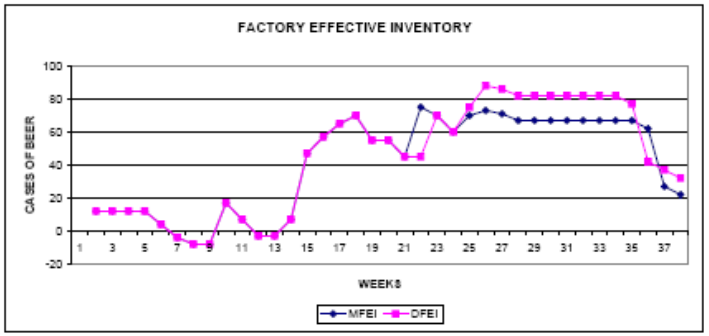
Supply Line:
SLt = FSL = FPD1+FPD2

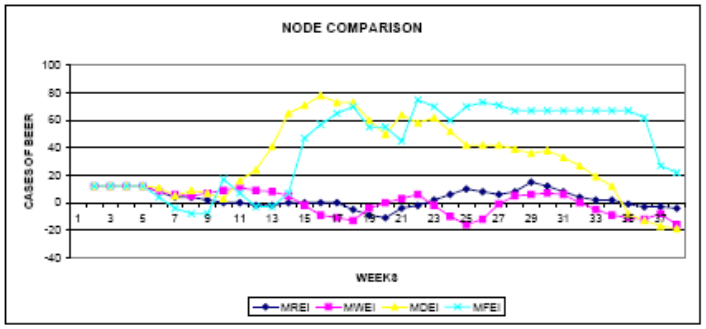
GUINESS 2 GAME MODEL WEEKS 21 TO 40

MODEL CHARTS



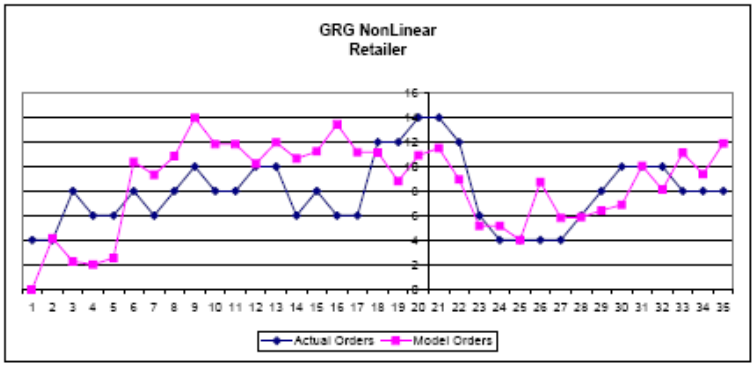


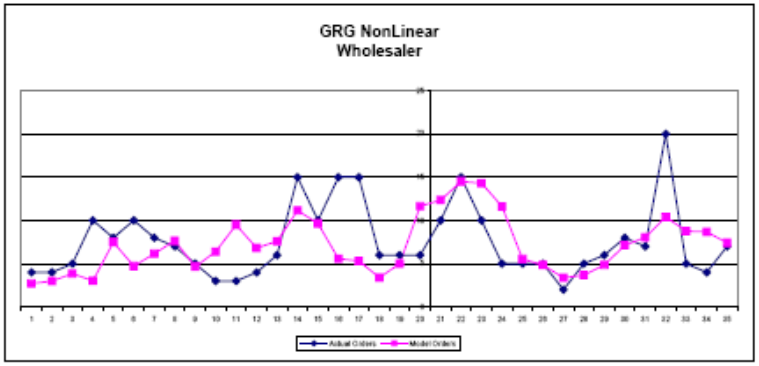


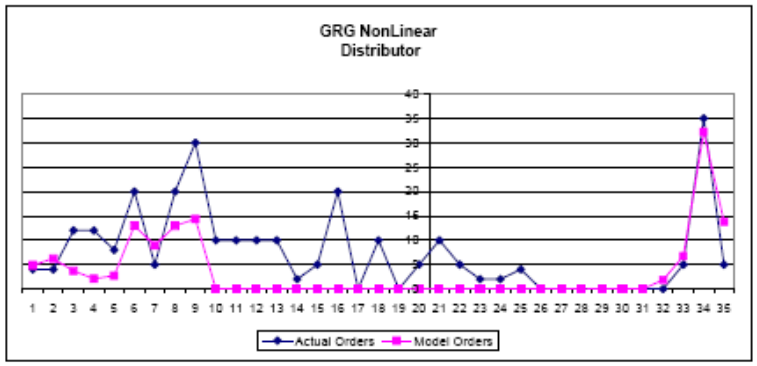


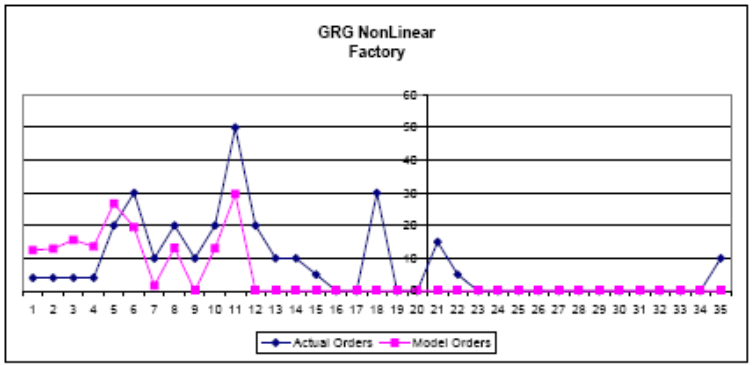
GUINESS 2 GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









GUINESS 2 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	GUINESS 2	IT							GUINESS 2	Retailer	IT					
	Team Costs	$ 1,927.00							Costs	$ 144.50						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	8	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	6	8	16		16	4
5	8	16	4	8	0	8	8	8	*12*	28	6	6	18		16	4
6	8	12	8	6	0	8	4	4	*8*	30	8	6	20		12	5
7	8	12	6	6	0	8	4	4	*4*	32	6	8	20		11	10
8	8	10	6	8	0	8	2	2	*4*	33	8	6	20		15	8
9	8	8	8	6	0	8	0	0	*2*	33	10	8	22		15	10
10	8	8	6	8	0	8	0	0	*0*	33	8	10	24		19	8
11	8	6	8	10	2	6	0	-2	*-2*	35	8	8	26		19	7
12	8	8	10	8	2	8	0	-2	*-2*	37	10	8	26		16	5
13	8	10	8	8	0	10	0	0	*0*	37	10	10	26		13	3
14	8	8	8	8	0	8	0	0	*0*	37	6	10	28		8	3
15	8	8	8	3	0	8	0	0	*0*	37	8	6	26		3	4
16	8	8	3	4	0	8	0	0	*1*	37	6	8	26		4	6
17	8	3	4	6	5	3	0	-5	*-4*	42	6	6	29		6	15
18	8	4	6	15	9	4	0	-9	*-8*	51	12	6	31		15	10
19	8	6	15	10	11	6	0	-11	*-10*	62	12	12	37		10	15
20	8	15	10	12	4	15	0	-4	*-3*	66	14	12	34		15	15
21	8	10	12	12	2	10	0	-2	*-2*	68	14	14	38		18	6
22	8	12	12	12	0	10	2	2	*2*	69	12	14	40		12	6
23	8	14	12	6	0	8	6	6	*6*	72	6	12	40		6	6
24	8	18	6	6	0	8	10	10	*11*	77	4	6	34		6	10
25	8	16	6	10	0	8	8	8	*13*	81	4	4	32		10	15
26	8	14	10	15	0	8	6	6	*17*	84	4	4	30		15	10
27	8	16	15	5	0	8	8	8	*14*	88	4	4	24		10	5
28	8	23	5	4	0	8	15	15	*10*	95.5	6	4	13		10	5
29	8	20	4	4	0	8	12	12	*6*	101.5	8	6	14		11	5
30	8	16	4	6	0	8	8	8	*4*	105.5	10	8	18		12	2
31	8	12	6	8	0	8	4	4	*4*	107.5	10	10	24		8	5
32	8	10	8	5	0	8	2	2	*4*	108.5	10	10	28		5	6
33	8	10	5	6	0	8	2	2	*8*	109.5	8	10	30		6	8
34	8	7	6	8	1	7	0	-1	*6*	110.5	8	8	33		8	7
35	8	6	8	7	3	6	0	-3	*-2*	113.5	8	8	35		7	12
36	8	8	7	12	3	8	0	-3	*-2*	116.5	10	8	35		12	0
37	8	7	12	0	4	7	0	-4	*-3*	120.5	11	10	38		0	0
38	8	12	0	0	0	12	0	0	*-3*	120.5	14	11	37		0	5
39	8	0	0	5	8	0	0	-8	*-4*	128.5	14	14	51		5	29
40	8	0	5	29	16	0	0	-16	*2*	144.5	8	14	65		29	7

GUINESS 2 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

	STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews						
					GUINESS 2	Wholesaler		IT									GUINESS 2
					Costs	$ 290.50											Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*-8*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*-8*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*-4*	18	5	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*-6*	24	10	5	13		16	4	4	0	12	12	*12*
5	5	0	8	8	*-6*	28	8	10	19		16	4	12	0	11	11	*11*
6	10	0	6	6	*0*	31	10	8	23		15	12	8	0	5	5	*5*
7	8	0	5	5	*2*	33.5	8	10	28		17	8	4	0	9	9	*9*
8	10	0	7	7	*4*	37	7	8	26		17	4	20	0	7	7	*7*
9	8	0	9	9	*8*	41.5	5	7	25		11	20	13	0	3	3	*2*
10	7	0	11	11	*8*	47	3	5	20		23	13	20	0	16	16	*15*
11	5	0	9	9	*10*	51.5	3	3	15		29	20	27	0	24	24	*23*
12	3	0	8	8	*12*	55.5	4	3	11		44	27	10	0	41	41	*40*
13	3	0	5	5	*10*	58	6	4	10		68	10	13	0	65	65	*44*
14	4	2	0	-2	*6*	60	15	6	13		75	13	10	0	71	71	*70*
15	6	9	0	-9	*8*	69	10	15	25		84	10	10	0	78	78	*77*
16	15	11	0	-11	*5*	80	15	10	31		88	10	2	0	73	73	*72*
17	10	13	0	-13	*10*	93	15	15	40		83	2	5	0	73	73	*72*
18	15	4	0	-4	*20*	97	6	15	40		75	5	20	0	60	60	*59*
19	15	0	0	0	*22*	97	6	6	36		65	20	0	0	50	50	*49*
20	6	0	3	3	*17*	98.5	6	6	27		70	0	10	0	64	64	*63*
21	6	0	6	6	*16*	101.5	10	6	18		64	10	0	0	58	58	*57*
22	6	2	0	-2	*10*	103.5	15	10	22		68	0	5	0	62	62	*61*
23	10	10	0	-10	*0*	113.5	10	15	31		62	5	10	0	52	52	*51*
24	15	16	0	-16	*-7*	129.5	5	10	35		57	10	5	0	42	42	*41*
25	10	12	0	-12	*-9*	141.5	5	5	30		52	5	2	0	42	42	*41*
26	5	1	0	-1	*-13*	142.5	5	5	20		47	2	2	0	42	42	*40*
27	5	0	5	5	*-10*	145	2	5	15		44	2	4	0	39	39	*37*
28	5	0	6	6	*-4*	148	5	2	12		41	4	0	0	36	36	*34*
29	2	0	7	7	*2*	151.5	6	5	12		40	0	0	0	38	38	*36*
30	5	0	6	6	*6*	154.5	8	6	13		38	0	0	0	33	33	*31*
31	6	0	0	0	*6*	154.5	7	8	19		33	0	0	0	27	27	*25*
32	8	5	0	-5	*6*	159.5	20	7	21		27	0	0	0	19	19	*17*
33	7	9	0	-9	*0*	168.5	5	20	35		19	0	0	0	12	12	*10*
34	12	11	0	-11	*2*	179.5	4	5	32		12	0	0	8	0	-8	*-10*
35	0	12	0	-12	*10*	191.5	7	4	29		0	0	5	13	0	-13	*-5*
36	0	8	0	-8	*12*	199.5	10	7	24		0	5	35	17	0	-17	*-1*
37	5	16	0	-16	*14*	215.5	7	10	34		5	36	5	19	0	-19	*14*
38	29	26	0	-26	*17*	241.5	10	7	41		35	5	10	0	6	6	*9*
39	7	32	0	-32	*18*	273.5	20	10	46		11	10	10	0	4	4	*7*
40	10	17	0	-17	*6*	290.5	8	20	37		14	10	10	0	4	4	*7*

GUINESS 2 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									GUINESS 2	Factory	IT		
	$ 664.00											Costs	$ 828.00			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	12	4	12		16	4	4	0	12	12	*12*	18	4	8	
4	24	12	12	20		16	4	4	0	12	12	*12*	24	4	8	
5	29.5	8	12	28		16	4	4	0	4	4	*4*	26	20	8	
6	32	20	8	32		8	4	20	4	0	-4	*-4*	30	30	24	
7	36.5	5	20	40		4	20	30	8	0	-8	*-8*	38	10	50	
8	40	20	5	37		20	30	10	8	0	-8	*-8*	46	20	40	
9	41.5	30	20	53		30	10	20	0	17	17	*17*	54.5	10	30	
10	49.5	10	30	63		27	20	10	0	7	7	*7*	58	20	30	
11	61.5	10	10	60		27	10	20	3	0	-3	*-3*	61	50	30	
12	82	10	10	50		10	20	50	3	0	-3	*-3*	64	20	70	
13	114.5	10	10	33		20	50	20	0	7	7	*7*	67.5	10	70	
14	150	2	10	33		57	20	10	0	47	47	*47*	91	10	30	
15	189	5	2	22		67	10	10	0	57	57	*57*	119.5	5	20	
16	225.5	20	5	17		67	10	5	0	65	65	*65*	152	0	15	
17	262	0	20	27		75	5	0	0	70	70	*70*	187	0	5	
18	292	10	0	25		75	0	0	0	55	55	*55*	214.5	30	0	
19	317	0	10	30		55	0	30	0	55	55	*55*	242	0	30	
20	349	5	0	10		55	30	0	0	45	45	*45*	264.5	0	30	
21	378	10	5	15		75	0	0	0	75	75	*45*	302	15	0	
22	409	5	10	15		75	0	15	0	70	70	*70*	337	5	15	
23	435	2	5	20		70	15	5	0	60	60	*60*	367	0	20	
24	456	2	2	17		75	5	0	0	70	70	*75*	402	0	5	
25	477	4	2	9		75	0	0	0	73	73	*88*	438.5	0	0	
26	498	0	4	8		73	0	0	0	71	71	*86*	474	0	0	
27	517.5	0	0	6		71	0	0	0	67	67	*82*	507.5	0	0	
28	535.5	0	0	4		67	0	0	0	67	67	*82*	541	0	0	
29	554.5	0	0	0		67	0	0	0	67	67	*82*	574.5	0	0	
30	571	0	0	0		67	0	0	0	67	67	*82*	608	0	0	
31	584.5	0	0	0		67	0	0	0	67	67	*82*	641.5	0	0	
32	594	0	0	0		67	0	0	0	67	67	*82*	675	0	0	
33	600	5	0	0		67	0	0	0	67	67	*82*	708.5	0	0	
34	608	35	5	5		67	0	0	0	67	67	*77*	742	0	0	
35	621	5	35	40		67	0	0	0	62	62	*42*	773	10	0	
36	638	10	5	45		62	0	10	0	27	27	*37*	786.5	10	10	
37	657	10	10	50		27	10	10	0	22	22	*32*	797.5	5	20	
38	660	10	10	25		32	10	5	0	22	22	*32*	808.5	5	15	
39	662	20	10	30		32	5	5	0	22	22	*32*	819.5	5	10	
40	664	30	20	40		27	5	5	0	17	17	*27*	828	20	10	

GUINESS 2 GAME MODEL WEEKS 21 TO 40 MODEL DATA

GUINESS 2 IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	-8	4	12	4	12
2	4	12	4	-8	4	12	4	12
3	8	12	5	-4	12	12	4	12
4	6	12	10	-6	12	12	4	12
5	6	12	8	-6	8	11	20	4
6	8	8	10	0	20	5	30	-4
7	6	4	8	2	5	9	10	-8
8	8	4	7	4	20	7	20	-8
9	10	2	5	8	30	2	10	17
10	8	0	3	8	10	15	20	7
11	8	-2	3	10	10	23	50	-3
12	10	-2	4	12	10	40	20	-3
13	10	0	6	10	10	44	10	7
14	6	0	15	6	2	70	10	47
15	8	0	10	8	5	77	5	57
16	6	1	15	5	20	72	0	65
17	6	-4	15	10	0	72	0	70
18	12	-8	6	20	10	59	30	55
19	12	-10	6	22	0	49	0	55
20	14	-3	6	17	5	63	0	45
21	14	-2	10	16	10	57	15	45
22	12	2	15	10	5	61	5	70
23	6	6	10	0	2	51	0	60
24	4	11	5	-7	2	41	0	75
25	4	13	5	-9	4	41	0	88
26	4	17	5	-13	0	40	0	86
27	4	14	2	-10	0	37	0	82
28	6	10	5	-4	0	34	0	82
29	8	6	6	2	0	36	0	82
30	10	4	8	6	0	31	0	82
31	10	4	7	6	0	25	0	82
32	10	4	20	6	0	17	0	82
33	8	8	5	0	5	10	0	82
34	8	6	4	2	35	-10	0	77
35	8	-2	7	10	5	-5	10	42
36	10	-2	10	12	10	-1	10	37
37	11	-3	7	14	10	14	5	32
38	14	-3	10	17	10	9	5	32
39	14	-4	20	18	20	7	5	32
40	8	2	8	6	30	7	20	27

GUZZLERS GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.428477	0	4	16	12	12	12
2	4	4.00	4	0.932384	3.401486	0.5985137	0.3582186	12	12	12
3	4	4.00	6	0.218444	2.687546	3.3124541	10.9723523	12	12	12
4	4	4.00	4	0.153249	2.622351	1.3776489	1.89791656	12	12	14
5	8	4.00	10	0.437608	3.626684	6.3713161	40.5936685	8	8	14
6	8	8.00	10	-0.785364	7.127686	2.8723137	8.25018613	4	4	20
7	8	8.00	10	-0.183002	8.091036	1.9089642	3.64414431	2	2	24
8	8	8.00	10	1.362297	9.997322	0.0026783	7.173E-06	-2	0	30
9	8	8.00	10	1.489403	10.12443	-0.124428	0.01548221	0	0	30
10	8	8.00	8	0.666536	9.30156	-1.30156	1.69405871	0	0	32
11	8	8.00	8	-1.414416	7.220609	0.7793912	0.60746072	-2	0	34
12	8	8.00	8	-0.044439	8.590585	-0.590585	0.34879094	-6	0	38
13	8	8.00	8	-2.446538	6.188487	1.8115132	3.28158008	-6	0	38
14	8	8.00	8	-0.604688	8.030336	-0.030336	0.0009203	-14	0	46
15	8	8.00	8	-0.381803	8.253221	-0.253221	0.06412088	-22	0	54
16	8	8.00	8	-0.163484	8.471541	-0.471541	0.22235087	-28	0	60
17	8	8.00	8	1.452833	10.08786	-2.087858	4.35914902	-34	0	66
18	8	8.00	8	-0.625941	8.009083	-0.009083	8.25E-05	-40	0	72
19	8	8.00	8	-0.044439	8.590585	-0.590585	0.34879094	-44	0	76
20	8	8.00	8	-2.446538	6.188487	1.8115132	3.28158008	-50	0	82
21	8	8.00	8	-0.264714	8.370311	-0.370311	0.13713007	-52	0	84
22	8	8.00	8	-0.153732	8.481293	-0.481293	0.23164271	-54	0	86
23	8	8.00	8	-0.014023	8.621002	-0.621002	0.38564345	-56	0	88
24	8	8.00	20	-1.664861	6.970163	13.029837	169.776642	-52	0	84
25	8	8.00	10	-1.14088	7.494144	2.505856	6.27931422	-50	0	94
26	8	8.00	8	-0.792511	7.842514	0.1574861	0.02480187	-48	0	94
27	8	8.00	8	0.685181	9.320205	-1.320205	1.74294143	-26	0	72
28	8	8.00	2	-1.911139	6.723886	-4.723886	22.3150967	-14	0	60
29	8	8.00	2	-1.246658	7.388366	-5.388366	29.0344897	-7	0	47
30	8	8.00	8	0.898562	9.533566	-1.533566	2.35188605	-11	0	45
31	8	8.00	8	-1.624431	7.010594	0.9894063	0.9789248	-19	0	53
32	8	8.00	8	-0.718157	7.916868	0.0831324	0.006911	-27	0	61
33	8	8.00	8	-0.973602	7.661422	0.3385778	0.11463496	-19	0	53
34	8	8.00	8	0.984799	9.619823	-1.619823	2.62382738	-7	0	41
35	8	8.00	8	2.357362	10.08992	-2.089919	4.36775995	5	5	29
36	9	8.00	8	0.681412	7.511502	0.4884985	0.23863076	10	10	24
37	10	9.00	8	1.55521	9.385299	-1.385299	1.91905368	10	10	24
38	11	10.00	8	-0.264714	9.565376	-0.565376	0.31964958	10	10	24
39	12	11.00	15	-0.153732	9.676358	5.3236424	28.3411685	10	10	24
40	13	12.00	8	-0.014023	10.81607	-2.816067	7.93023228	10	10	31
	mean of the disturbance			-0.216521		0.5240961	mean of the standard errors			
	std dev of the disturbance			1.134591						

			constraints	
Σ (AO-Ot)2	279.1204			
θ	1.00		>=0	<=1
αs	0.18		>=0	<=1
β	0.00		>=0	<=1
S'	3.52		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

GUZZLERS GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	2.683737	4	-1.39193	0	4	16	12	12	12
2	4	3.566863	4	0.964666	1.547608	2.4523917	6.01422515	12	12	12
3	4	3.85747	4	-1.409028	0	4	16	12	12	12
4	6	3.953098	4	-0.19784	0.771337	3.2286631	10.4242653	12	12	12
5	4	5.326435	6	1.190337	4.195499	1.804501	3.2562238	10	10	12
6	10	4.436484	4	-0.635576	1.479635	2.5203649	6.35223924	10	10	14
7	10	8.169238	10	0.044498	7.880407	2.1195927	4.49267314	4	4	14
8	10	9.397559	10	0.563546	10.95307	-0.953074	0.90834922	-2	0	20
9	10	9.801757	10	1.236027	12.02975	-2.029752	4.11989446	-6	0	24
10	10	9.934765	10	-0.442668	10.48407	-0.484065	0.23431936	-12	0	30
11	8	9.978533	10	0.03512	11.00562	-1.005622	1.01127469	-14	0	32
12	8	8.651067	8	-1.475936	8.167099	-0.167099	0.02792218	-22	0	42
13	8	8.214244	8	-0.166357	9.039855	-1.039855	1.08129871	-30	0	50
14	8	8.0705	8	0.348723	9.411192	-1.411192	1.99146213	-36	0	56
15	8	8.023199	12	-0.996536	8.018631	3.9813686	15.8512959	-42	0	62
16	8	8.007634	1	0.871648	9.871251	-8.871251	78.6990859	-48	0	72
17	8	8.002512	2	-1.566211	7.428269	-5.428269	29.4661034	-52	0	69
18	8	8.000827	4	-0.829159	8.163636	-4.163636	17.3358659	-58	0	69
19	8	8.000272	15	-1.39193	7.600311	7.3996894	54.7554033	-60	0	67
20	8	8.00009	10	0.964666	9.956724	0.043276	0.00187281	-62	0	76
21	8	8.000029	10	-1.346086	7.645912	2.354088	5.54173042	-64	0	80
22	8	8.00001	10	0.561296	9.543274	0.4567259	0.20859855	-60	0	78
23	8	8.000003	14	-1.403072	7.588899	6.4111008	41.102213	-58	0	78
24	8	8.000001	30	-1.29776	7.694209	22.305791	497.548301	-56	0	82
25	20	8	10	-0.926071	8.065898	1.9341023	3.74075173	-34	0	82
26	10	16.05121	20	-0.527692	16.51549	3.4845111	12.1418177	-34	0	72
27	8	11.99125	10	0.492123	13.47534	-3.475337	12.0779676	-29	0	77
28	8	9.313382	10	1.610326	11.91568	-1.915677	3.66981714	-33	0	83
29	2	8.432189	8	1.354515	10.77867	-2.778672	7.7210208	-41	0	93
30	2	4.116612	4	-1.780326	3.328255	0.6717449	0.45124122	-43	0	101
31	8	2.696504	4	0.775658	4.464131	-0.464131	0.21541718	-29	0	89
32	8	6.254802	0	-0.340092	6.906678	-6.906678	47.7021974	-17	0	73
33	8	7.425715	0	-1.386535	7.031148	-7.031148	49.4370437	-5	0	53
34	8	7.811023	0	-1.100593	7.03975	-7.03975	49.5580752	2	2	38
35	8	7.937814	0	0.059639	7.664124	-7.664124	58.7388028	4	4	28
36	8	7.979537	4	-1.398907	2.93406	1.0659397	1.13622736	14	14	10
37	8	7.993266	8	-0.379504	3.967193	4.0328069	16.2635314	14	14	6
38	8	7.997784	4	0.987256	7.326415	-3.326415	11.0650382	8	8	12
39	8	7.999271	4	-2.393474	6.597765	-2.597765	6.74838363	0	0	16
40	15	7.99976	10	0.525718	9.517446	0.4825537	0.23285808	-4	0	16
	mean of the disturbance			-0.272817		0.1811023	mean of the standard errors			
	std dev of the disturbance			1.012292						

Σ (AO-Ot)2	825.301		constraints		
θ	0.67		>=0	<=1	
αs	0.33		>=0	<=1	
β	0.00		>=0	<=1	
S'	2.99		>=0	<=100	

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

GUZZLERS GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	3.117111	4	1.877504	0	4	16	12	12	12
2	4	3.805127	4	-0.643521	0	4	16	12	12	12
3	4	3.956987	4	-0.853565	0	4	16	12	12	12
4	4	3.990508	2	-0.331842	0	2	4	12	12	12
5	4	3.997904	0	-0.122785	0	0	0	12	12	10
6	6	3.999537	0	-0.113101	0	0	0	12	12	6
7	4	5.558453	0	-0.144978	0	0	0	10	10	2
8	10	4.343985	2	-0.873587	0	2	4	8	8	0
9	10	8.751592	2	-0.823031	7.86731	-5.86731	34.4253295	-2	0	2
10	10	9.724448	2	-1.464368	8.13758	-6.13758	37.6898921	-12	0	4
11	10	9.93918	4	-0.764055	8.991375	-4.991375	24.9138236	-22	0	6
12	10	9.986578	2	-0.122785	9.618791	-7.618791	58.0459814	-30	0	8
13	8	9.997037	6	-0.113101	9.638936	-3.638936	13.2418555	-38	0	8
14	8	8.440791	8	-0.144978	7.928313	0.0716867	0.00513898	-44	0	12
15	8	8.097292	10	-0.873587	6.733706	3.2662936	10.6686742	-48	0	16
16	12	8.021475	25	-0.823031	6.463444	18.536556	343.603893	-54	0	24
17	1	11.12185	18	-1.464368	8.34061	9.6593902	93.3038197	-60	0	43
18	2	3.234118	12	-0.764055	0.785691	11.214309	125.76073	-55	0	55
19	4	2.272397	12	-0.122785	0.281491	11.718509	137.323456	-51	0	61
20	15	3.61868	11	-0.113101	1.637457	9.3625435	87.6572199	-43	0	61
21	10	12.48789	13	-1.049737	9.539406	3.4605943	11.9757132	-48	0	62
22	10	10.54913	4	1.531525	10.09004	-6.090036	37.0885408	-48	0	65
23	10	10.12121	0	-1.246372	7.68046	-7.68046	58.9894734	-28	0	39
24	14	10.02875	0	1.26138	10.70626	-10.70626	114.623971	-18	0	19
25	30	13.12302	20	-0.560536	12.43998	7.5600199	57.1539008	-17	0	4
26	10	26.27487	30	-0.056323	25.60605	4.3939483	19.3067814	-43	0	20
27	20	13.59223	15	-0.320266	11.74071	3.259286	10.6229455	-53	0	50
28	10	18.58566	10	0.65677	17.25181	-7.25181	52.5887493	-73	0	65
29	10	11.89505	18	-0.238002	9.850173	8.1498269	66.4196783	-67	0	59
30	8	10.41828	8	0.037263	8.70992	-0.70992	0.50398605	-57	0	57
31	4	8.533768	22	-0.428476	6.72717	15.27283	233.259342	-45	0	45
32	4	5.000704	2	0.255775	3.663981	-1.663981	2.76883332	-34	0	52
33	0	4.220878	0	-0.222311	2.651069	-2.651069	7.02816572	-28	0	44
34	0	0.931642	0	1.785418	1.920811	-1.920811	3.6895143	-10	0	26
35	0	0.205634	0	-0.588215	0	0	0	-2	0	18
36	0	0.045388	0	2.091421	0	0	0	16	16	0
37	4	0.010018	0	-0.867414	0	0	0	16	16	0
38	8	3.119322	0	0.998644	0	0	0	12	12	0
39	4	6.922726	0	-1.049737	1.872989	-1.872989	3.50808754	4	4	0
40	4	4.645111	0	1.531525	6.176636	-6.176636	38.1508301	0	0	0
	mean of the disturbance			-0.228035		1.5713559	mean of the standard errors			
	std dev of the disturbance			0.818075						

Σ (AO-Ot)2	717.6785		constraints		
θ	0.78		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.03		>=0	<=1	
S'	0.00		>=0	<=100	
	GRG NonLinear				

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

GUZZLERS GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0	4	0.712753	6.85848	-2.85848	8.1709086	12	12	8
2	4	0	4	0.816418	6.962146	-2.962146	8.77430607	12	12	8
3	4	0	5	1.296658	7.442385	-2.442385	5.96524328	12	12	8
4	4	0	0	-0.926762	5.218965	-5.218965	27.2375935	12	12	9
5	2	0	0	-0.472901	5.672826	-5.672826	32.1809595	12	12	5
6	0	0	0	-0.699766	5.235081	-5.235081	27.4060705	15	15	0
7	0	0	0	-1.767338	4.167509	-4.167509	17.3681334	15	15	0
8	0	0	0	-0.039002	5.895846	-5.895846	34.7609959	15	15	0
9	2	0	0	-2.434708	3.500139	-3.500139	12.2509735	15	15	0
10	2	0	4	0.461252	6.526685	-2.526685	6.38413918	13	13	0
11	2	0	2	0.268421	6.484441	-4.484441	20.1102138	11	11	4
12	4	0	1	-1.464331	4.892276	-3.892276	15.1498123	9	9	6
13	2	0	2	0.51872	6.875327	-4.875327	23.7688123	9	9	3
14	6	0	6	0.140847	6.497454	-0.497454	0.24746034	9	9	3
15	8	0	12	-0.583639	6.124535	5.8754654	34.5210933	4	4	8
16	10	0	10	0.365536	7.354784	2.645216	6.99716772	-2	0	18
17	25	0	10	0.820722	7.80997	2.1900303	4.79623279	-6	0	22
18	18	0	30	3.180125	10.16937	19.830627	393.253769	-19	0	20
19	12	0	20	-0.807247	6.182001	13.817999	190.93711	-27	0	40
20	12	0	20	1.134829	8.124077	11.875923	141.037548	-29	0	50
21	11	0	10	0.602506	7.591753	2.4082469	5.79965303	-11	0	40
22	13	0	4	-1.770241	5.219007	-1.219007	1.48597724	-2	0	30
23	4	0	1	0.206075	6.843856	-5.843856	34.1506536	5	5	14
24	0	0	0	-0.689073	5.526948	-5.526948	30.5471533	11	11	5
25	0	0	20	0.761624	6.698471	13.303529	176.983891	15	15	1
26	20	0	20	-1.18384	4.680714	15.319286	234.680523	16	16	20
27	30	0	15	-0.595176	6.394072	8.6059282	74.062001	-4	0	40
28	15	0	10	-0.77703	6.212217	3.7877825	14.3472964	-14	0	35
29	10	0	18	0.881562	7.87081	10.12919	102.600492	-9	0	25
30	18	0	8	0.280008	7.269256	0.730744	0.53398678	-4	0	28
31	8	0	22	-1.682609	5.306638	16.693362	278.668331	-12	0	26
32	22	0	2	0.956915	7.946162	-5.946162	35.3568472	-2	0	30
33	2	0	0	0.215055	7.204303	-7.204303	51.9019796	-16	0	24
34	0	0	0	-0.069232	6.638843	-6.638843	44.074231	4	4	2
35	0	0	0	0.374712	6.9422	-6.9422	48.1941367	6	6	0
36	0	0	0	-1.176598	5.39089	-5.39089	29.0616903	6	6	0
37	0	0	0	-0.40475	6.162737	-6.162737	37.9793275	6	6	0
38	0	0	0	-1.617325	4.950162	-4.950162	24.5041067	6	6	0
39	0	0	0	-0.388601	6.178887	-6.178887	38.1786426	6	6	0
40	0	0	0	1.37376	7.941247	-7.941247	63.0634042	6	6	0
	mean of the disturbance			-0.056516		0.9617844	mean of the standard errors			
	std dev of the disturbance			1.098473						

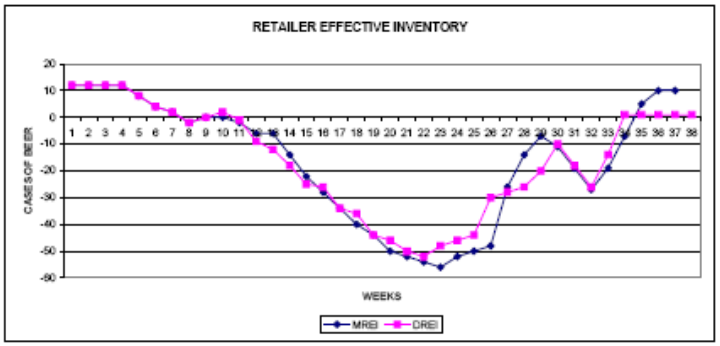
Σ (AO-Ot)2	1326.174		constraints		
θ	0.00		>=0	<=1	
αs	0.07		>=0	<=1	
β	0.00		>=0	<=1	
S'	99.43		>=0	<=100	

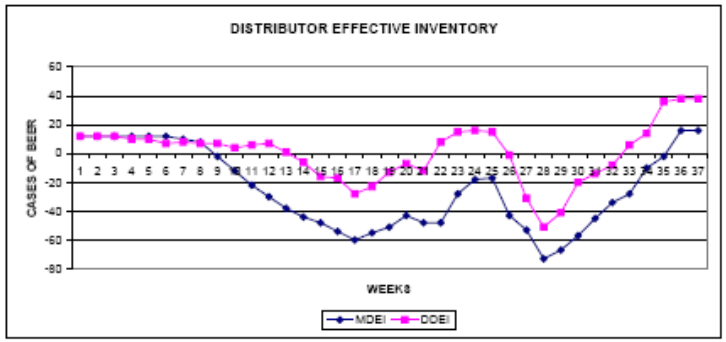
GRG NonLinear

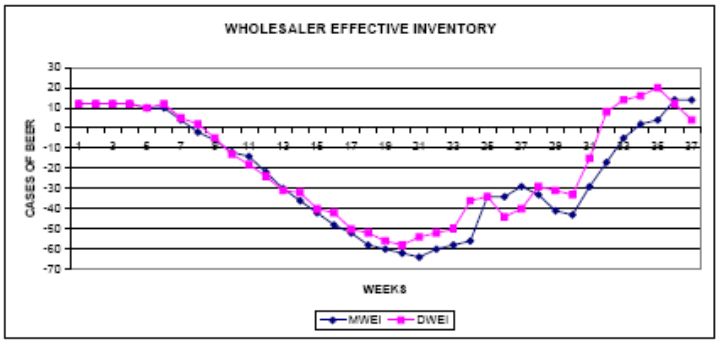
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

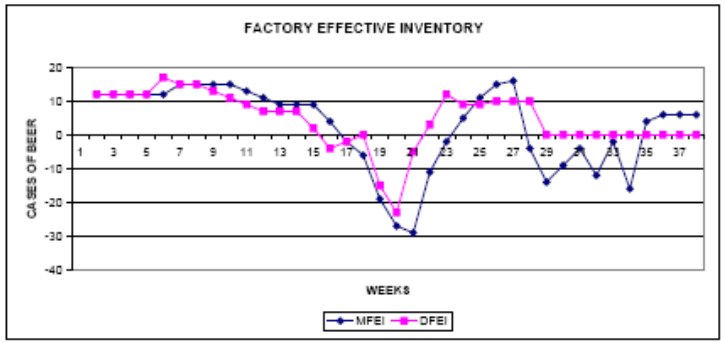
GUZZLERS GAME MODEL WEEKS 21 TO 40

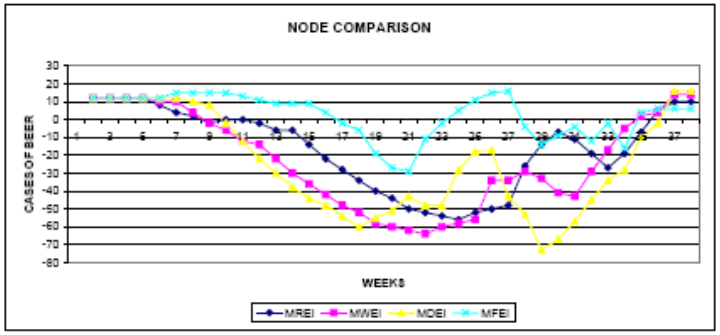
MODEL CHARTS





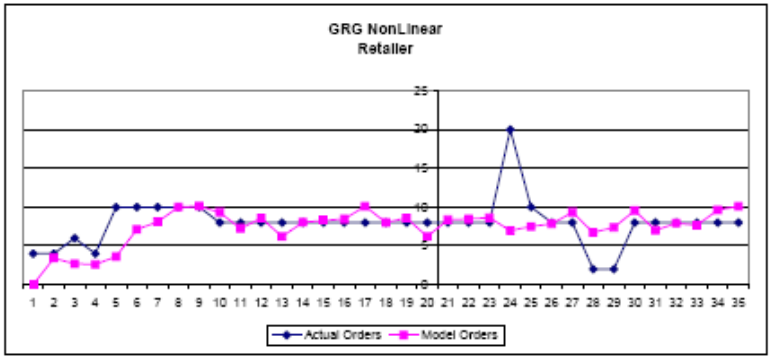


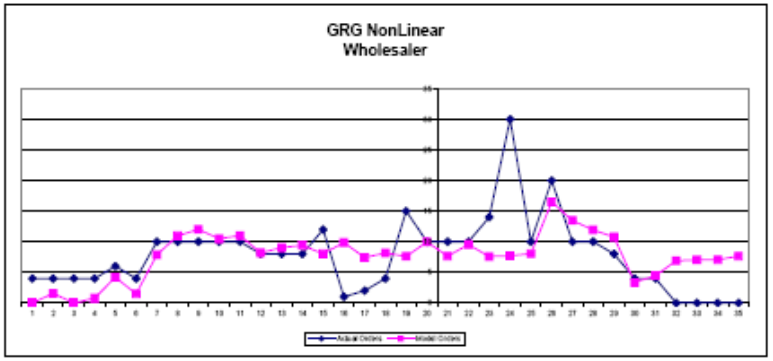


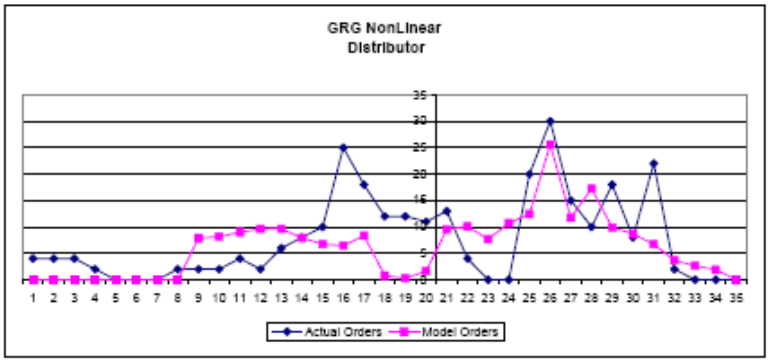


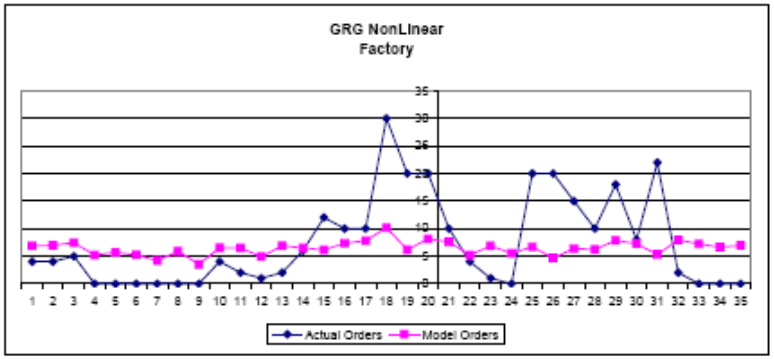
GUZZLERS GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









GUZZLERS GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	GUZZLERS	IT							GUZZLERS	Retailer	IT					
	Team Costs	$ 3,143.50							Costs	$ 748.50						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	6	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	4	6	14		16	4
5	8	16	4	6	0	8	8	8	*8*	28	10	4	14		16	4
6	8	12	6	4	0	8	4	4	*4*	30	10	10	20		14	4
7	8	10	4	10	0	8	2	2	*2*	31	10	10	24		14	4
8	8	6	10	8	2	6	0	-2	*-2*	33	10	10	30		8	6
9	8	10	8	6	0	10	0	0	*0*	33	10	10	30		6	4
10	8	8	6	4	0	8	0	0	*2*	33	8	10	32		4	8
11	8	6	4	8	2	6	0	-2	*-1*	35	8	8	34		8	0
12	8	4	8	0	6	4	0	-6	*-9*	41	8	8	38		0	0
13	8	8	0	0	6	8	0	-6	*-12*	47	8	8	38		0	2
14	8	0	0	2	14	0	0	-14	*-18*	61	8	8	46		2	2
15	8	0	2	2	22	0	0	-22	*-25*	83	8	8	54		2	2
16	8	2	2	2	28	2	0	-28	*-26*	111	8	8	60		2	4
17	8	2	2	4	34	2	0	-34	*-34*	145	8	8	66		4	2
18	8	2	4	2	40	2	0	-40	*-36*	185	8	8	72		2	6
19	8	4	2	6	44	4	0	-44	*-44*	229	8	8	76		6	6
20	8	2	6	6	50	2	0	-50	*-46*	279	8	8	82		6	6
21	8	6	6	6	52	6	0	-52	*-50*	331	8	8	84		6	12
22	8	6	6	12	54	6	0	-54	*-52*	385	8	8	86		12	10
23	8	6	12	10	56	6	0	-56	*-48*	441	8	8	88		10	10
24	8	12	10	10	52	12	0	-52	*-46*	493	20	8	84		10	30
25	8	10	10	30	50	10	0	-50	*-44*	543	10	20	94		30	20
26	8	10	30	20	48	10	0	-48	*-30*	591	8	10	94		20	15
27	8	30	20	15	26	30	0	-26	*-28*	617	8	8	72		15	4
28	8	20	15	4	14	20	0	-14	*-26*	631	2	8	60		4	0
29	8	15	4	0	7	15	0	-7	*-20*	638	2	2	47		0	0
30	8	4	0	0	11	4	0	-11	*-10*	649	8	2	45		0	16
31	8	0	0	16	19	0	0	-19	*-18*	668	8	8	53		16	20
32	8	0	16	20	27	0	0	-27	*-26*	695	8	8	61		20	20
33	8	16	20	20	19	16	0	-19	*-14*	714	8	8	53		20	15
34	8	20	20	13	7	20	0	-7	*1*	721	8	8	41		15	10
35	8	20	13	8	0	15	5	5	*1*	723.5	8	8	29		12	18
36	8	18	8	8	0	8	10	10	*1*	728.5	8	8	24		22	8
37	8	18	8	8	0	8	10	10	*1*	733.5	8	8	24		22	2
38	8	18	8	8	0	8	10	10	*1*	738.5	8	8	24		16	0
39	8	18	8	8	0	8	10	10	*1*	743.5	15	8	24		8	4
40	8	18	8	4	0	8	10	10	*-3*	748.5	8	15	31		4	8

GUZZLERS GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					GUZZLERS Costs	Wholesaler $ 1,008.00		IT								GUZZLERS Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	4	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	4	4	12		16	4	4	0	12	12	*10*
5	4	0	10	10	*10*	29	6	4	12		16	4	4	0	12	12	*10*
6	4	0	10	10	*12*	34	4	6	14		16	4	2	0	12	12	*7*
7	6	0	4	4	*5*	36	10	4	14		16	2	0	0	10	10	*8*
8	4	2	0	-2	*2*	38	10	10	20		12	0	0	0	8	8	*7*
9	8	6	0	-6	*-5*	44	10	10	24		8	0	0	2	0	-2	*7*
10	0	12	0	-12	*-13*	56	10	10	30		0	0	2	12	0	-12	*4*
11	0	14	0	-14	*-18*	70	10	10	32		0	2	2	22	0	-22	*6*
12	2	22	0	-22	*-24*	92	8	10	42		2	2	2	30	0	-30	*7*
13	2	30	0	-30	*-31*	122	8	8	50		2	2	4	38	0	-38	*1*
14	2	36	0	-36	*-32*	158	8	8	56		2	4	2	44	0	-44	*-6*
15	4	42	0	-42	*-40*	200	12	8	62		4	2	6	48	0	-48	*-16*
16	2	48	0	-48	*-42*	248	1	12	72		2	6	6	54	0	-54	*-17*
17	6	52	0	-52	*-50*	300	2	1	69		6	6	6	60	0	-60	*-28*
18	6	58	0	-58	*-52*	358	4	2	69		6	6	12	55	0	-55	*-23*
19	6	60	0	-60	*-56*	418	15	4	67		6	12	10	51	0	-51	*-13*
20	12	62	0	-62	*-58*	480	10	15	76		12	10	10	43	0	-43	*-7*
21	10	64	0	-64	*-54*	544	10	10	80		10	10	30	48	0	-48	*-12*
22	10	60	0	-60	*-52*	604	10	10	78		10	30	20	48	0	-48	*8*
23	30	58	0	-58	*-50*	662	14	10	78		30	20	15	28	0	-28	*15*
24	20	56	0	-56	*-36*	718	30	14	82		20	15	4	18	0	-18	*16*
25	15	34	0	-34	*-34*	752	10	30	82		15	4	0	17	0	-17	*15*
26	4	34	0	-34	*-44*	786	20	10	72		4	0	0	43	0	-43	*-1*
27	0	29	0	-29	*-40*	815	10	20	77		0	0	16	53	0	-53	*-31*
28	0	33	0	-33	*-29*	848	10	10	83		0	16	20	73	0	-73	*-51*
29	16	41	0	-41	*-31*	889	8	10	93		16	20	20	67	0	-67	*-41*
30	20	43	0	-43	*-33*	932	4	8	101		20	20	15	57	0	-57	*-20*
31	20	29	0	-29	*-15*	961	4	4	89		20	15	10	45	0	-45	*-14*
32	15	17	0	-17	*8*	978	0	4	73		15	10	18	34	0	-34	*-8*
33	10	5	0	-5	*14*	983	0	0	53		10	18	8	28	0	-28	*6*
34	18	0	2	2	*16*	984	0	0	38		18	8	18	10	0	-10	*14*
35	8	0	4	4	*20*	986	0	0	28		8	18	0	2	0	-2	*36*
36	2	0	14	14	*12*	993	4	0	10		18	0	0	0	16	16	*38*
37	0	0	14	14	*4*	1000	8	4	6		16	0	0	0	16	16	*38*
38	4	0	8	8	*-4*	1004	4	8	12		16	0	0	0	12	12	*34*
39	8	0	0	0	*-12*	1004	4	4	16		12	0	0	0	4	4	*30*
40	4	4	0	-4	*-16*	1008	10	4	16		4	0	0	0	0	0	*22*

GUZZLERS GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									GUZZLERS	Factory	IT		
	$ 1,099.00											Costs	$ 288.00			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	4	4	12		16	4	4	0	12	12	*12*	18	5	8	
4	24	2	4	12		16	4	5	0	12	12	*12*	24	0	9	
5	30	0	2	10		16	5	0	0	12	12	*17*	30	0	5	
6	36	0	0	6		17	0	0	0	15	15	*15*	37.5	0	0	
7	41	0	0	2		15	0	0	0	15	15	*15*	45	0	0	
8	45	2	0	0		15	0	0	0	15	15	*13*	52.5	0	0	
9	47	2	2	2		15	0	0	0	15	15	*11*	60	0	0	
10	59	2	2	4		15	0	0	0	13	13	*9*	66.5	4	0	
11	81	4	2	6		13	0	4	0	11	11	*7*	72	2	4	
12	111	2	4	8		11	4	2	0	9	9	*7*	76.5	1	6	
13	149	6	2	8		13	2	1	0	9	9	*7*	81	2	3	
14	193	8	6	12		11	1	2	0	9	9	*2*	85.5	6	3	
15	241	10	8	16		10	2	6	0	4	4	*-4*	87.5	12	8	
16	295	25	10	24		6	6	12	2	0	-2	*-2*	89.5	10	18	
17	355	18	25	43		6	12	10	6	0	-6	*0*	95.5	10	22	
18	410	12	18	55		12	10	10	19	0	-19	*-15*	114.5	30	20	
19	461	12	12	61		10	10	30	27	0	-27	*-23*	141.5	20	40	
20	504	11	12	61		10	30	20	29	0	-29	*-5*	170.5	20	50	
21	552	13	11	62		30	20	20	11	0	-11	*3*	181.5	10	40	
22	600	4	13	65		20	20	10	2	0	-2	*12*	183.5	4	30	
23	628	0	4	39		20	10	4	0	5	5	*9*	186	1	14	
24	646	0	0	19		15	4	1	0	11	11	*9*	191.5	0	5	
25	663	20	0	4		15	1	0	0	15	15	*10*	199	20	1	
26	706	30	20	20		16	0	20	0	16	16	*10*	207	20	20	
27	759	15	30	50		16	20	20	4	0	-4	*10*	211	15	40	
28	832	10	15	65		20	20	15	14	0	-14	*0*	225	10	35	
29	899	18	10	59		20	15	10	9	0	-9	*0*	234	18	25	
30	956	8	18	57		15	10	18	4	0	-4	*0*	238	8	28	
31	1001	22	8	45		10	18	8	12	0	-12	*0*	250	22	26	
32	1035	2	22	52		18	8	22	2	0	-2	*0*	252	2	30	
33	1063	0	2	44		8	22	2	16	0	-16	*0*	268	0	24	
34	1073	0	0	26		22	2	0	0	4	4	*0*	270	0	2	
35	1075	0	0	18		6	0	0	0	6	6	*0*	273	0	0	
36	1083	0	0	0		6	0	0	0	6	6	*0*	276	0	0	
37	1091	0	0	0		6	0	0	0	6	6	*0*	279	0	0	
38	1097	0	0	0		6	0	0	0	6	6	*0*	282	0	0	
39	1099	0	0	0		6	0	0	0	6	6	*0*	285	0	0	
40	1099	0	0	0		6	0	0	0	6	6	*0*	288	0	0	

GUZZLERS GAME MODEL WEEKS 21 TO 40 MODEL DATA

GUZZLERS IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	6	12	4	12	4	12	5	12
4	4	12	4	12	2	10	0	12
5	10	8	6	10	0	10	0	17
6	10	4	4	12	0	7	0	15
7	10	2	10	5	0	8	0	15
8	10	-2	10	2	2	7	0	13
9	10	0	10	-5	2	7	0	11
10	8	2	10	-13	2	4	4	9
11	8	-1	10	-18	4	6	2	7
12	8	-9	8	-24	2	7	1	7
13	8	-12	8	-31	6	1	2	7
14	8	-18	8	-32	8	-6	6	2
15	8	-25	12	-40	10	-16	12	-4
16	8	-26	1	-42	25	-17	10	-2
17	8	-34	2	-50	18	-28	10	0
18	8	-36	4	-52	12	-23	30	-15
19	8	-44	15	-56	12	-13	20	-23
20	8	-46	10	-58	11	-7	20	-5
21	8	-50	10	-54	13	-12	10	3
22	8	-52	10	-52	4	8	4	12
23	8	-48	14	-50	0	15	1	9
24	20	-46	30	-36	0	16	0	9
25	10	-44	10	-34	20	15	20	10
26	8	-30	20	-44	30	-1	20	10
27	8	-28	10	-40	15	-31	15	10
28	2	-26	10	-29	10	-51	10	0
29	2	-20	8	-31	18	-41	18	0
30	8	-10	4	-33	8	-20	8	0
31	8	-18	4	-15	22	-14	22	0
32	8	-26	0	8	2	-8	2	0
33	8	-14	0	14	0	6	0	0
34	8	1	0	16	0	14	0	0
35	8	1	0	20	0	36	0	0
36	8	1	4	12	0	38	0	0
37	8	1	8	4	0	38	0	0
38	8	1	4	-4	0	34	0	0
39	15	1	4	-12	0	30	0	0
40	8	-3	10	-16	0	22	0	0

HEINEKEN GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	-1.494082	4.482402	-0.482402	0.23271179	12	12	12
2	4	4.00	4	2.311704	12.28819	-8.288188	68.694082	12	12	12
3	4	4.00	8	-0.488733	9.487751	-1.487751	2.21340298	12	12	12
4	4	4.00	8	1.090971	9.63461	-1.63461	2.67194843	12	12	16
5	8	4.00	12	2.334143	11.54875	0.4512531	0.20362939	8	8	20
6	8	8.00	12	-0.360296	12.09243	-0.092427	0.00854282	4	4	28
7	8	8.00	12	1.779314	12.79919	-0.799192	0.63870803	4	4	32
8	8	8.00	12	-0.02308	9.563963	2.4360473	5.9343286	4	4	36
9	8	8.00	12	0.513674	8.332379	3.6676213	13.451446	6	6	38
10	8	8.00	12	1.072321	7.625922	4.3740781	19.1325593	5	5	43
11	8	8.00	12	-0.77514	4.010132	7.9898678	63.8379848	7	7	45
12	8	8.00	12	-1.022624	2.497544	9.502456	90.2966691	6	6	50
13	8	8.00	16	-2.657037	0	16	256	3	3	57
14	8	8.00	16	-1.131785	0	16	256	5	5	63
15	8	8.00	16	0.852196	0	16	256	9	9	67
16	8	8.00	8	-1.592292	0	8	64	14	14	70
17	8	8.00	8	-0.271098	0	8	64	21	21	63
18	8	8.00	0	-0.828699	0	0	0	33	33	51
19	8	8.00	0	0.09262	0	0	0	60	60	16
20	8	8.00	0	1.144154	0	0	0	60	60	8
21	8	8.00	0	0.034563	0	0	0	60	60	0
22	8	8.00	0	-0.323751	0	0	0	52	52	0
23	8	8.00	0	1.937242	3.381781	-3.381781	11.4364405	44	44	0
24	8	8.00	8	0.579984	6.232143	1.7678574	3.1253199	36	36	0
25	8	8.00	8	-2.44835	4.545739	3.454261	11.9319189	28	28	8
26	8	8.00	8	-0.74488	7.591138	0.4088619	0.16716804	20	20	16
27	8	8.00	8	-3.009199	6.668749	1.3312506	1.77222805	12	12	24
28	8	8.00	8	0.027169	9.705117	-1.705117	2.90742407	12	12	24
29	8	8.00	8	0.488874	10.16682	-2.166822	4.69511693	12	12	24
30	8	8.00	8	-0.151008	9.52694	-1.52694	2.33154655	12	12	24
31	8	8.00	8	-0.797678	8.88027	-0.88027	0.77487578	12	12	24
32	8	8.00	8	-0.538757	9.139192	-1.139192	1.2977575	12	12	24
33	8	8.00	8	-0.835519	8.842429	-0.842429	0.70968873	12	12	24
34	8	8.00	8	-0.526054	9.151894	-1.151894	1.32685961	12	12	24
35	8	8.00	10	-0.961247	8.716701	1.2832992	1.64685671	12	12	24
36	9	8.00	10	-0.644482	9.317043	1.6829565	2.83234264	12	12	28
37	10	9.00	10	0.37733	9.622433	0.3775667	0.14255661	12	12	28
38	11	10.00	10	0.23551	9.76419	0.2358096	0.05560617	12	12	30
39	12	11.00	10	-0.357844	9.118931	0.8810692	0.776283	14	14	30
40	13	12.00	10	-0.796327	9.628543	1.3714573	1.8808952	16	16	30
	mean of the disturbance			-0.192068		2.1453668	mean of the standard errors			
	std dev of the disturbance			1.284376						

Σ (AO-Ot)2	49.81088	constraints		
θ	1.00	>=0	<=1	
αs	0.53	>=0	<=1	
β	0.68	>=0	<=1	
S'	31.54	>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

HEINEKEN GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	1.42081	4	0.407793	70.11146	-66.11146	4370.72503	12	12	12
2	4	2.336945	4	-2.070111	68.54969	-64.54969	4166.66245	12	12	12
3	4	2.927666	6	-2.009328	69.20119	-63.20119	3994.39094	12	12	12
4	8	3.308562	7	-0.231518	69.6001	-62.6001	3918.77242	12	12	14
5	8	4.974972	10	-0.746343	72.11198	-62.11199	3857.89851	8	8	17
6	12	6.049469	12	-0.924499	71.72892	-59.72892	3567.54416	4	4	23
7	12	8.163112	15	-0.210203	73.27746	-58.27746	3396.26223	-2	0	29
8	12	9.525984	19	0.407793	68.21912	-49.21912	2422.52216	-7	0	37
9	12	10.40476	21	-2.070111	58.70089	-37.70089	1421.35731	-9	0	46
10	12	10.97139	30	-2.009328	47.0097	-17.0097	289.330001	-14	0	60
11	12	11.33676	45	-0.231518	27.15537	17.844633	318.430926	-21	0	85
12	12	11.57234	45	-0.746343	0	45	2025	-23	0	120
13	12	11.72425	44	-0.924499	0	44	1936	-23	0	153
14	16	11.8222	44	-0.210203	0	44	1936	-22	0	184
15	16	13.30616	46	0.407793	0	46	2116	-23	0	213
16	16	14.26302	50	-2.070111	0	50	2500	-19	0	239
17	8	14.88	36	-2.009328	0	36	1296	12	12	242
18	8	12.43621	0	-0.231518	0	0	0	37	37	245
19	0	10.86046	0	-0.746343	0	0	0	79	79	195
20	0	7.002795	0	-0.924499	0	0	0	154	154	120
21	0	4.515385	0	0.457672	0	0	0	274	274	0
22	0	2.911509	0	0.561959	0	0	0	274	274	0
23	0	1.877334	0	-0.828917	0	0	0	274	274	0
24	0	1.2105	0	-0.500451	0	0	0	274	274	0
25	8	0.780528	0	0.824575	0	0	0	274	274	0
26	8	3.344902	0	-1.478092	0	0	0	266	266	0
27	8	4.998404	0	-0.281621	0	0	0	258	258	0
28	8	6.064578	0	-0.637749	0	0	0	250	250	0
29	8	6.752045	0	-1.837751	0	0	0	242	242	0
30	8	7.195322	0	-0.863146	0	0	0	234	234	0
31	8	7.481145	0	-1.706526	0	0	0	226	226	0
32	8	7.665444	0	1.0277	0	0	0	218	218	0
33	8	7.784279	0	-1.292852	0	0	0	210	210	0
34	8	7.860904	0	-0.518162	0	0	0	202	202	0
35	8	7.910311	0	-0.257106	0	0	0	194	194	0
36	10	7.942169	0	-0.758357	0	0	0	186	186	0
37	10	8.673115	0	-1.434473	0	0	0	176	176	0
38	10	9.144428	0	1.200614	0	0	0	166	166	0
39	10	9.448329	0	0.457672	0	0	0	156	156	0
40	10	9.644284	0	0.561959	0	0	0	146	146	0
		mean of the disturbance		-0.699226		-7.361883	mean of the standard errors			
		std dev of the disturbance		0.903421						

		constraints	
Σ (AO-Ot)2	0		
θ	0.36	>=0	<=1
αs	1.00	>=0	<=1
β	0.88	>=0	<=1
S'	90.84	>=0	<=100

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

HEINEKEN GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	2.572808	4	0.403321	0	4	16	12	12	12
2	4	3.490781	4	-0.422502	0	4	16	12	12	12
3	4	3.818312	6	0.148967	0.171594	5.8284061	33.9703175	12	12	12
4	6	3.935174	4	-0.962358	0	4	16	12	12	14
5	7	5.263274	5	-0.922084	2.377136	2.6228643	6.87941724	10	10	14
6	10	6.38034	10	-0.358544	6.973557	3.0264434	9.15935989	7	7	15
7	12	8.708513	12	-0.946826	12.37671	-0.376707	0.14190813	3	3	19
8	15	10.8256	15	-0.812834	16.95431	-1.954311	3.81932956	-5	0	27
9	19	13.51058	20	-0.824808	18.78547	1.2145337	1.47509221	-15	0	37
10	21	17.04139	30	1.162675	23.4619	6.5380969	42.7467106	-24	0	47
11	30	19.58758	30	-0.882824	22.44726	7.5527389	57.0438653	-33	0	65
12	45	26.28487	50	1.330329	29.92656	20.073438	402.942894	-50	0	82
13	45	38.32248	100	-2.906414	34.78095	65.219045	4253.52387	-80	0	117
14	44	42.61747	250	-0.500994	34.74657	215.25343	46334.0391	-105	0	197
15	44	43.50672	0	1.420341	20.46759	-20.46759	419.92238	-102	0	400
16	46	43.824	20	1.728354	23.87099	-3.870991	14.9845721	-113	0	367
17	50	45.22361	0	-1.684341	24.38346	-24.38346	594.562925	-109	0	337
18	36	48.29579	0	-0.882824	34.57103	-34.57103	1195.15632	-84	0	262
19	0	40.38711	0	1.330329	0	0	0	122	122	20
20	0	14.41004	0	-2.906414	0	0	0	142	142	0
21	0	5.141473	0	0.524645	0	0	0	142	142	0
22	0	1.834467	0	-0.648011	0	0	0	142	142	0
23	0	0.654534	0	-0.693327	0	0	0	142	142	0
24	0	0.233536	0	-1.044253	0	0	0	142	142	0
25	0	0.083325	0	0.951346	0	0	0	142	142	0
26	0	0.02973	0	0.617235	0	0	0	142	142	0
27	0	0.010608	0	1.161294	0	0	0	142	142	0
28	0	0.003785	0	0.748368	0	0	0	142	142	0
29	0	0.00135	0	1.052583	0	0	0	142	142	0
30	0	0.000482	0	0.082044	0	0	0	142	142	0
31	0	0.000172	0	-1.042103	0	0	0	142	142	0
32	0	6.13E-05	0	-1.054449	0	0	0	142	142	0
33	0	2.19E-05	0	-0.754891	0	0	0	142	142	0
34	0	7.81E-06	0	-0.980489	0	0	0	142	142	0
35	0	2.79E-06	0	-0.257837	0	0	0	142	142	0
36	0	9.94E-07	0	0.068353	0	0	0	142	142	0
37	0	3.55E-07	0	-0.140464	0	0	0	142	142	0
38	0	1.27E-07	0	-1.406965	0	0	0	142	142	0
39	0	4.52E-08	0	2.080214	0	0	0	142	142	0
40	0	1.61E-08	0	0.330348	0	0	0	142	142	0
		mean of the disturbance		-0.252209		7.2487116	mean of the standard errors			
		std dev of the disturbance		1.138728						

			constraints	
Σ (AO-Ot)2	0			
θ	0.64		>=0	<=1
αs	1.00		>=0	<=1
β	0.08		>=0	<=1
S'	9.21		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO+\alpha s(s'-S_t-\beta SL_t)+\varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

HEINEKEN GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	3.185379	4	0.983213	72.72822	-68.72822	4723.56769	12	12	8
2	4	3.834098	4	0.006693	72.40042	-68.40042	4678.61684	12	12	8
3	4	3.966213	4	0.630395	73.15623	-69.15623	4782.58442	12	12	8
4	6	3.993119	6	0.066898	72.61963	-66.61963	4438.17533	12	12	8
5	4	5.591288	8	-0.349929	75.49313	-67.49313	4555.3224	10	10	10
6	5	4.324074	10	-0.614206	73.70701	-63.70701	4058.58348	10	10	14
7	10	4.862344	6	0.301885	73.99702	-67.99702	4623.59484	11	11	18
8	12	8.953689	15	-1.156027	78.57722	-63.57722	4042.0633	9	9	16
9	15	11.3796	20	0.679546	84.33989	-64.33989	4139.62095	7	7	21
10	20	14.26269	50	-1.231624	90.78872	-40.78872	1663.71928	-2	0	35
11	30	18.83157	30	0.344118	94.70536	-64.70536	4186.78406	-7	0	70
12	30	27.72549	50	1.374189	103.9928	-53.99279	2915.22188	-17	0	80
13	50	29.53678	75	1.079428	102.7801	-27.78014	771.736235	3	3	80
14	100	45.83256	250	-1.549649	116.3115	133.68851	17872.6177	-17	0	125
15	250	88.96851	100	-0.117926	148.1479	-48.1479	2318.22034	-67	0	325
16	0	217.2051	100	0.643655	275.5546	-175.5546	30819.4328	-242	0	350
17	20	44.23497	100	1.277613	105.4891	-5.489103	30.1302487	8	8	200
18	0	24.93568	50	-1.898331	10.23744	39.762555	1581.06082	88	88	200
19	0	5.078263	20	0.983213	0	20	400	188	188	150
20	0	1.034215	0	0.006693	0	0	0	288	288	70
21	0	0.210623	0	0.347975	0	0	0	338	338	20
22	0	0.042895	0	0.426763	0	0	0	358	358	0
23	0	0.008736	0	0.47593	0	0	0	358	358	0
24	0	0.001779	0	0.158483	0	0	0	358	358	0
25	0	0.000362	0	-0.784921	0	0	0	358	358	0
26	0	7.38E-05	0	0.597878	0	0	0	358	358	0
27	0	1.5E-05	0	1.002821	0	0	0	358	358	0
28	0	3.06E-06	0	-2.526848	0	0	0	358	358	0
29	0	6.23E-07	0	0.840852	0	0	0	358	358	0
30	0	1.27E-07	0	-0.218819	0	0	0	358	358	0
31	0	2.59E-08	0	-0.08379	0	0	0	358	358	0
32	0	5.26E-09	0	-1.479021	0	0	0	358	358	0
33	0	1.07E-09	0	1.620795	0	0	0	358	358	0
34	0	2.18E-10	0	-1.270915	0	0	0	358	358	0
35	0	4.45E-11	0	0.604801	0	0	0	358	358	0
36	0	9.08E-12	0	-1.986503	0	0	0	358	358	0
37	0	1.84E-12	0	0.947601	0	0	0	358	358	0
38	0	3.76E-13	0	0.596259	0	0	0	358	358	0
39	0	7.65E-14	0	0.347975	0	0	0	358	358	0
40	0	1.56E-14	0	0.426763	0	0	0	358	358	0
	mean of the disturbance			0.033538		-23.51504	mean of the standard errors			
	std dev of the disturbance			0.998651						

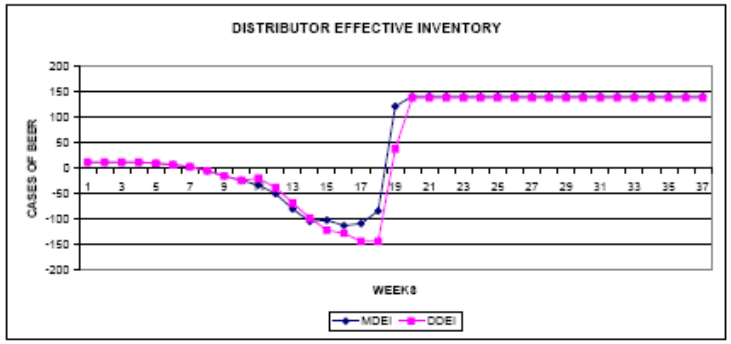
Σ (AO-Ot)2	0		constraints		
θ	0.80		>=0	<=1	
αs	0.91		>=0	<=1	
β	0.07		>=0	<=1	
S'	87.92		>=0	<=100	

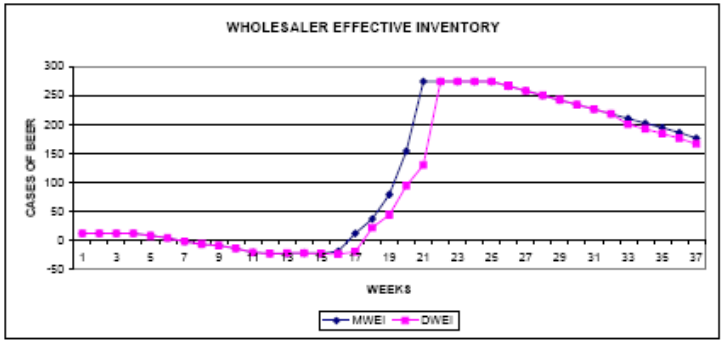
GRG NonLinear

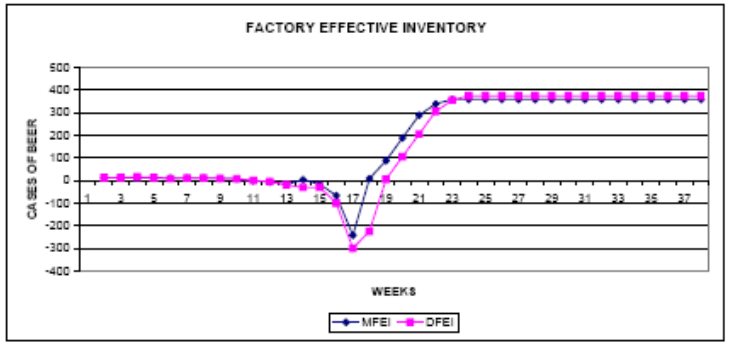
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

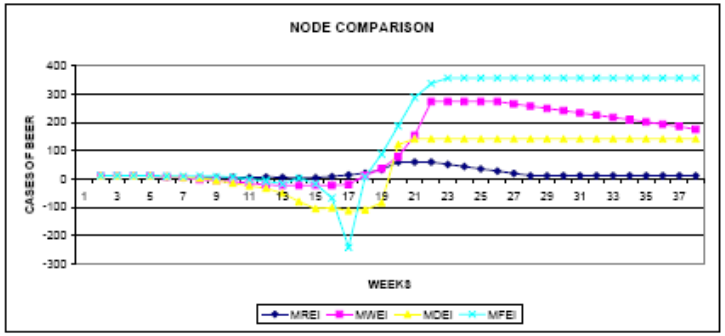
HEINEKEN GAME MODEL WEEKS 21 TO 40

MODEL CHARTS



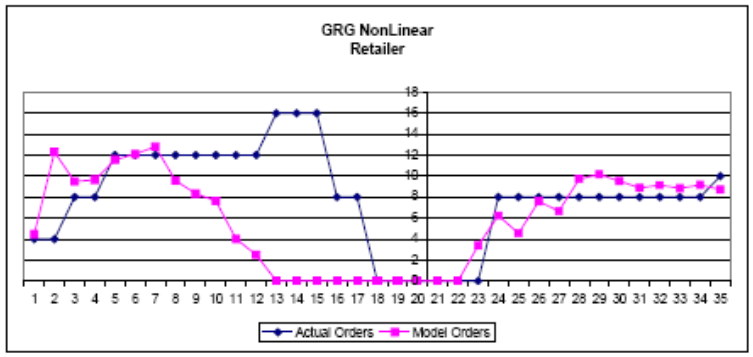


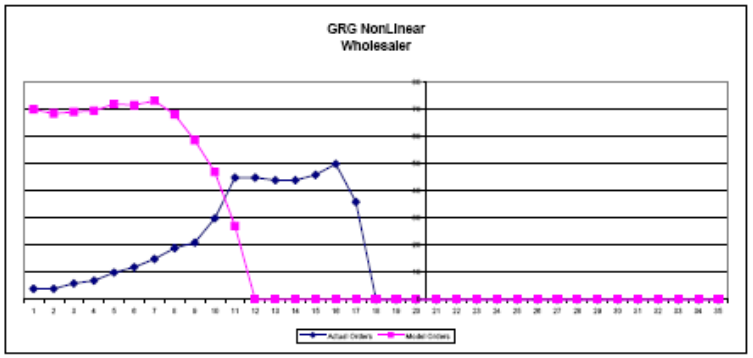


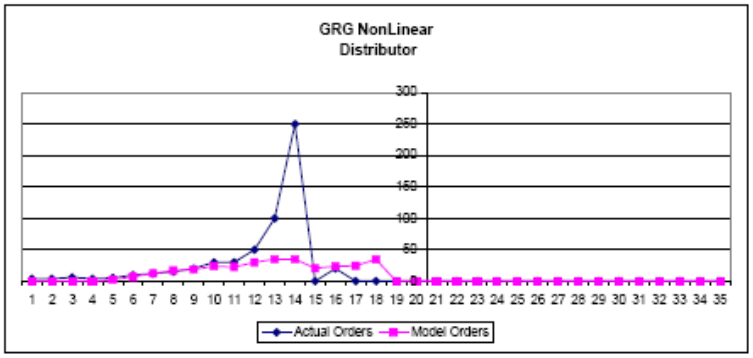


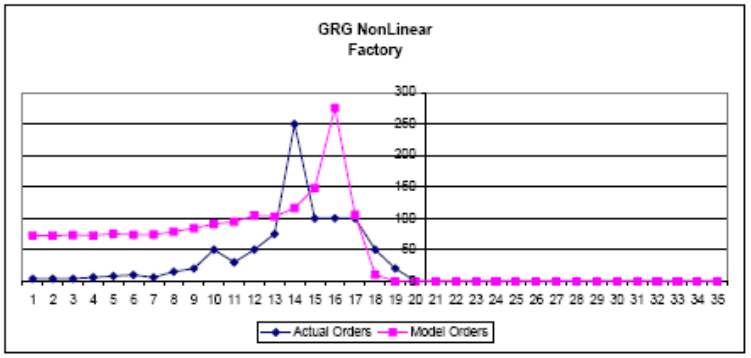
HEINEKEN GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









HEINEKEN GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	HEINEKEN	IT							HEINEKEN	Retailer	IT					
	Team Costs	$ 9,502.50							Costs	$ 355.50						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	8	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	8	8	16		16	4
5	8	16	4	8	0	8	8	8	*8*	28	12	8	20		16	4
6	8	12	8	8	0	8	4	4	*4*	30	12	12	28		12	6
7	8	12	8	10	0	8	4	4	*4*	32	12	12	32		10	7
8	8	12	10	7	0	8	4	4	*6*	34	12	12	36		7	10
9	8	14	7	10	0	8	6	6	*5*	37	12	12	38		10	7
10	8	13	10	7	0	8	5	5	*7*	39.5	12	12	43		7	5
11	8	15	7	5	0	8	7	7	*6*	43	12	12	45		5	10
12	8	14	5	10	0	8	6	6	*6*	46	12	12	50		10	12
13	8	11	10	12	0	8	3	3	*7*	47.5	16	12	57		12	13
14	8	13	12	13	0	8	5	5	*6*	50	16	16	63		13	15
15	8	17	13	15	0	8	9	9	*3*	54.5	16	16	67		15	20
16	8	22	15	20	0	8	14	14	*5*	61.5	8	16	70		20	47
17	8	29	20	35	0	8	21	21	*10*	72	8	8	63		47	33
18	8	41	35	8	0	8	33	33	*14*	88.5	0	8	51		45	50
19	8	68	8	8	0	8	60	60	*21*	118.5	0	0	16		87	75
20	8	68	8	0	0	8	60	60	*28*	148.5	0	0	8		154	120
21	8	68	0	0	0	8	60	60	*31*	178.5	0	0	0		274	0
22	8	60	0	0	0	8	52	52	*60*	204.5	0	0	0		274	0
23	8	52	0	0	0	8	44	44	*60*	226.5	0	0	0		274	0
24	8	44	0	0	0	8	36	36	*52*	244.5	8	0	0		274	0
25	8	36	0	0	0	8	28	28	*44*	258.5	8	8	8		274	0
26	8	28	0	8	0	8	20	20	*36*	268.5	8	8	16		274	0
27	8	20	8	8	0	8	12	12	*28*	274.5	8	8	24		266	0
28	8	20	8	8	0	8	12	12	*20*	280.5	8	8	24		258	0
29	8	20	8	8	0	8	12	12	*12*	286.5	8	8	24		250	0
30	8	20	8	8	0	8	12	12	*12*	292.5	8	8	24		242	0
31	8	20	8	8	0	8	12	12	*12*	298.5	8	8	24		234	0
32	8	20	8	8	0	8	12	12	*12*	304.5	8	8	24		226	0
33	8	20	8	8	0	8	12	12	*12*	310.5	8	8	24		218	0
34	8	20	8	8	0	8	12	12	*12*	316.5	8	8	24		210	0
35	8	20	8	8	0	8	12	12	*12*	322.5	10	8	24		202	0
36	8	20	8	8	0	8	12	12	*12*	328.5	10	10	26		194	0
37	8	20	8	10	0	8	12	12	*12*	334.5	10	10	28		186	0
38	8	20	10	10	0	8	12	12	*12*	340.5	10	10	30		176	0
39	8	22	10	10	0	8	14	14	*14*	347.5	10	10	30		166	0
40	8	24	10	10	0	8	16	16	*16*	355.5	10	10	30		156	0

HEINEKEN GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

	STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews							
					HEINEKEN Costs	Wholesaler $ 2,584.00		IT									HEINEKEN Costs	
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*	
0	4	0	12			0	4	4			12	4	4	0	12			
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*	
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*	
3	4	0	12	12	*12*	18	6	4	12		16	4	4	0	12	12	*12*	
4	4	0	12	12	*12*	24	7	6	14		16	4	4	0	12	12	*12*	
5	6	0	8	8	*8*	28	10	7	17		16	4	6	0	10	10	*10*	
6	7	0	4	4	*4*	30	12	10	23		14	6	4	0	7	7	*7*	
7	10	2	0	-2	*-2*	32	15	12	29		13	4	5	0	3	3	*3*	
8	7	7	0	-7	*-7*	39	19	15	37		7	5	10	5	0	-5	*-5*	
9	5	9	0	-9	*-9*	48	21	19	46		5	10	12	15	0	-15	*-15*	
10	10	14	0	-14	*-14*	62	30	21	60		10	12	13	24	0	-24	*-24*	
11	12	21	0	-21	*-21*	83	45	30	85		12	13	15	33	0	-33	*-20*	
12	13	23	0	-23	*-23*	106	45	45	120		13	15	20	50	0	-50	*-38*	
13	15	23	0	-23	*-22*	129	44	45	153		15	20	47	80	0	-80	*-68*	
14	20	22	0	-22	*-22*	151	44	44	184		20	47	33	105	0	-105	*-98*	
15	47	23	0	-23	*-23*	174	46	44	213		47	33	50	102	0	-102	*-122*	
16	33	19	0	-19	*-24*	193	50	46	239		33	50	75	113	0	-113	*-128*	
17	50	0	12	12	*-20*	199	36	50	242		50	75	242	109	0	-109	*-144*	
18	75	0	37	37	*22*	217.5	0	36	245		75	242	20	84	0	-84	*-144*	
19	120	0	79	79	*44*	257	0	0	195		242	20	0	0	122	122	*38*	
20	0	0	154	154	*94*	334	0	0	120		142	0	0	0	142	142	*139*	
21	0	0	274	274	*130*	471	0	0	0		142	0	0	0	142	142	*139*	
22	0	0	274	274	*274*	608	0	0	0		142	0	0	0	142	142	*139*	
23	0	0	274	274	*274*	745	0	0	0		142	0	0	0	142	142	*139*	
24	0	0	274	274	*274*	882	0	0	0		142	0	0	0	142	142	*139*	
25	0	0	274	274	*274*	1019	0	0	0		142	0	0	0	142	142	*139*	
26	0	0	266	266	*266*	1152	0	0	0		142	0	0	0	142	142	*139*	
27	0	0	258	258	*258*	1281	0	0	0		142	0	0	0	142	142	*139*	
28	0	0	250	250	*250*	1406	0	0	0		142	0	0	0	142	142	*139*	
29	0	0	242	242	*242*	1527	0	0	0		142	0	0	0	142	142	*139*	
30	0	0	234	234	*234*	1644	0	0	0		142	0	0	0	142	142	*139*	
31	0	0	226	226	*226*	1757	0	0	0		142	0	0	0	142	142	*139*	
32	0	0	218	218	*218*	1866	0	0	0		142	0	0	0	142	142	*139*	
33	0	0	210	210	*200*	1971	0	0	0		142	0	0	0	142	142	*139*	
34	0	0	202	202	*192*	2072	0	0	0		142	0	0	0	142	142	*139*	
35	0	0	194	194	*184*	2169	0	0	0		142	0	0	0	142	142	*139*	
36	0	0	186	186	*176*	2262	0	0	0		142	0	0	0	142	142	*139*	
37	0	0	178	178	*166*	2350	0	0	0		142	0	0	0	142	142	*139*	
38	0	0	168	168	*156*	2433	0	0	0		142	0	0	0	142	142	*139*	
39	0	0	158	158	*146*	2511	0	0	0		142	0	0	0	142	142	*139*	
40	0	0	148	148	*136*	2584	0	0	0		142	0	0	0	142	142	*139*	

HEINEKEN GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									HEINEKEN	Factory	IT		
	$ 2,306.00											Costs	$ 4,257.00			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	6	4	12		16	4	4	0	12	12	*16*	18	4	8	
4	24	4	6	14		16	4	4	0	12	12	*12*	24	6	8	
5	29	5	4	14		16	4	6	0	10	10	*8*	29	8	10	
6	32.5	10	5	15		14	6	8	0	10	10	*10*	34	10	14	
7	34	12	10	19		16	8	10	0	11	11	*11*	39.5	6	18	
8	39	15	12	27		19	10	6	0	9	9	*9*	44	15	16	
9	54	20	15	37		19	6	15	0	7	7	*7*	47.5	20	21	
10	78	30	20	47		13	15	20	2	0	-2	*0*	49.5	50	35	
11	111	30	30	65		15	20	50	7	0	-7	*-5*	56.5	30	70	
12	161	50	30	82		20	50	30	17	0	-17	*-20*	73.5	50	80	
13	241	100	50	117		50	30	50	0	3	3	*-30*	75	75	80	
14	346	250	100	197		33	50	75	17	0	-17	*-30*	92	250	125	
15	448	0	250	400		50	75	250	67	0	-67	*-100*	159	100	325	
16	561	20	0	367		75	250	100	242	0	-242	*-300*	401	100	350	
17	670	0	20	337		250	100	100	0	8	8	*-225*	405	100	200	
18	754	0	0	262		108	100	100	0	88	88	*5*	449	50	200	
19	815	0	0	20		188	100	50	0	188	188	*105*	543	20	150	
20	886	0	0	0		288	50	20	0	288	288	*205*	687	0	70	
21	957	0	0	0		338	20	0	0	338	338	*305*	856	0	20	
22	1028	0	0	0		358	0	0	0	358	358	*355*	1035	0	0	
23	1099	0	0	0		358	0	0	0	358	358	*375*	1214	0	0	
24	1170	0	0	0		358	0	0	0	358	358	*375*	1393	0	0	
25	1241	0	0	0		358	0	0	0	358	358	*375*	1572	0	0	
26	1312	0	0	0		358	0	0	0	358	358	*375*	1751	0	0	
27	1383	0	0	0		358	0	0	0	358	358	*375*	1930	0	0	
28	1454	0	0	0		358	0	0	0	358	358	*375*	2109	0	0	
29	1525	0	0	0		358	0	0	0	358	358	*375*	2288	0	0	
30	1596	0	0	0		358	0	0	0	358	358	*375*	2467	0	0	
31	1667	0	0	0		358	0	0	0	358	358	*375*	2646	0	0	
32	1738	0	0	0		358	0	0	0	358	358	*375*	2825	0	0	
33	1809	0	0	0		358	0	0	0	358	358	*375*	3004	0	0	
34	1880	0	0	0		358	0	0	0	358	358	*375*	3183	0	0	
35	1951	0	0	0		358	0	0	0	358	358	*375*	3362	0	0	
36	2022	0	0	0		358	0	0	0	358	358	*375*	3541	0	0	
37	2093	0	0	0		358	0	0	0	358	358	*375*	3720	0	0	
38	2164	0	0	0		358	0	0	0	358	358	*375*	3899	0	0	
39	2235	0	0	0		358	0	0	0	358	358	*375*	4078	0	0	
40	2306	0	0	0		358	0	0	0	358	358	*375*	4257	0	0	

HEINEKEN GAME MODEL WEEKS 21 TO 40 MODEL DATA

HEINEKEN IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	8	12	6	12	6	12	4	16
4	8	12	7	12	4	12	6	12
5	12	8	10	8	5	10	8	8
6	12	4	12	4	10	7	10	10
7	12	4	15	-2	12	3	6	11
8	12	6	19	-7	15	-5	15	9
9	12	5	21	-9	20	-15	20	7
10	12	7	30	-14	30	-24	50	0
11	12	6	45	-21	30	-20	30	-5
12	12	6	45	-23	50	-38	50	-20
13	16	7	44	-22	100	-68	75	-30
14	16	6	44	-22	250	-98	250	-30
15	16	3	46	-23	0	-122	100	-100
16	8	5	50	-24	20	-128	100	-300
17	8	10	36	-20	0	-144	100	-225
18	0	14	0	22	0	-144	50	5
19	0	21	0	44	0	38	20	105
20	0	28	0	94	0	139	0	205
21	0	31	0	130	0	139	0	305
22	0	60	0	274	0	139	0	355
23	0	60	0	274	0	139	0	375
24	8	52	0	274	0	139	0	375
25	8	44	0	274	0	139	0	375
26	8	36	0	266	0	139	0	375
27	8	28	0	258	0	139	0	375
28	8	20	0	250	0	139	0	375
29	8	12	0	242	0	139	0	375
30	8	12	0	234	0	139	0	375
31	8	12	0	226	0	139	0	375
32	8	12	0	218	0	139	0	375
33	8	12	0	200	0	139	0	375
34	8	12	0	192	0	139	0	375
35	10	12	0	184	0	139	0	375
36	10	12	0	176	0	139	0	375
37	10	12	0	166	0	139	0	375
38	10	12	0	156	0	139	0	375
39	10	14	0	146	0	139	0	375
40	10	16	0	136	0	139	0	375

HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-anoe	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.142534	3.982351	0.0176494	0.0003115	12	12	12
2	4	0.00	4	0.429623	4.269439	-0.269439	0.07259742	12	12	12
3	4	0.00	5	1.320386	5.160181	-0.160181	0.02566799	12	12	12
4	4	0.00	5	-1.105257	2.73456	2.2654404	5.1322204	12	12	13
5	8	0.00	8	0.832558	4.846912	3.1530881	9.9419643	8	8	14
6	8	0.00	5	-1.277608	2.911283	2.0887169	4.36273832	4	4	18
7	8	0.00	7	-0.114824	4.20497	2.7950305	7.81219534	1	1	18
8	8	0.00	10	0.248202	4.60963	5.39037	29.0560891	-2	0	20
9	8	0.00	10	0.101591	4.465019	5.5349811	30.6360158	-2	0	22
10	8	0.00	12	-0.554615	3.808813	8.1911868	67.0955417	-5	0	27
11	8	0.00	10	-0.39786	3.965568	6.034432	36.414389	-6	0	32
12	8	0.00	8	0.19558	4.559008	3.4409924	11.8404286	-4	0	32
13	8	0.00	20	-0.665912	3.697516	16.302484	265.770997	-2	0	30
14	8	0.00	10	0.392099	4.668258	5.331742	28.4274733	2	2	38
15	8	0.00	12	-0.368595	3.820296	8.179704	66.9075577	4	4	38
16	8	0.00	8	-0.172714	4.016177	3.9838233	15.8708484	4	4	42
17	8	0.00	8	-0.682675	3.506216	4.493784	20.1940943	4	4	42
18	8	0.00	8	-0.713474	3.388149	4.6118515	21.269174	6	6	40
19	8	0.00	8	-0.004276	4.359152	3.6408485	13.2557777	-2	0	48
20	8	0.00	8	1.931645	6.033267	1.9667325	3.86803888	6	6	40
21	8	0.00	8	-0.800104	2.865175	5.1348248	26.3864256	16	16	30
22	8	0.00	10	-0.410121	2.993352	7.0066477	49.0931127	22	22	24
23	8	0.00	10	0.266481	3.669954	6.3300456	40.0894766	22	22	26
24	8	0.00	10	-1.096953	2.306521	7.6934788	59.1896158	22	22	28
25	8	0.00	10	0.327136	3.73061	6.2693902	39.305254	22	22	30
26	8	0.00	5	-0.130542	3.185664	1.8143364	3.29181644	24	24	30
27	8	0.00	3	-0.769086	2.46085	0.5391498	0.2906825	26	26	25
28	8	0.00	0	-0.874745	2.266924	-2.266924	5.13894227	28	28	18
29	8	0.00	0	-1.155993	1.898407	-1.898407	3.60394882	30	30	8
30	8	0.00	0	-0.532263	2.65304	-2.65304	7.03861911	27	27	3
31	8	0.00	0	0.745366	4.148839	-4.148839	17.2128675	22	22	0
32	8	0.00	0	0.702628	4.455174	-4.455174	19.8485719	14	14	0
33	8	0.00	0	-0.741169	3.360454	-3.360454	11.2926485	6	6	0
34	8	0.00	0	-0.23829	4.125138	-4.125138	17.016763	-2	0	0
35	8	0.00	0	0.466473	4.829901	-4.829901	23.3279416	-10	0	0
36	9	0.00	0	0.710572	5.074	-5.074	25.7454788	-18	0	0
37	10	0.00	5	0.071046	4.434474	0.5655264	0.31982005	-26	0	0
38	11	0.00	5	0.745366	5.108793	-0.108793	0.01183601	-34	0	5
39	12	0.00	5	0.702628	5.066054	-0.066054	0.00436307	-42	0	10
40	13	0.00	5	-0.741169	3.622259	1.3777407	1.89816947	-50	0	15
	mean of the disturbance			-0.134451		2.6869496	mean of the standard errors			
	std dev of the disturbance			0.727092						

Σ (AO-Ot)2	350.0664		constraints		
θ	0.00		>=0	<=1	
αs	0.04		>=0	<=1	
β	0.00		>=0	<=1	
S'	100.00		>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0	4	-1.027268	62.86574	-58.86574	3465.17489	12	12	12
2	4	0	4	0.641861	64.53486	-60.53486	3664.46986	12	12	12
3	4	0	6	1.891667	65.78467	-59.78467	3574.20687	12	12	12
4	5	0	5	0.80307	63.92032	-58.92032	3471.60416	12	12	14
5	5	0	8	1.829502	65.55888	-57.55888	3313.02414	11	11	15
6	8	0	10	-0.136338	63.04153	-53.04153	2813.40354	10	10	19
7	5	0	8	-0.600874	63.02548	-55.02548	3027.80375	8	8	23
8	7	0	7	-0.77585	61.68687	-54.68687	2990.65428	8	8	26
9	10	0	8	-0.42701	61.42359	-53.42359	2854.08021	9	9	25
10	10	0	8	-0.026591	62.59977	-54.59977	2981.13439	9	9	23
11	12	0	8	-0.527596	64.09876	-56.09876	3147.07086	7	7	23
12	10	0	12	1.468031	70.70651	-58.70651	3446.45439	2	2	24
13	8	0	12	-0.39883	69.28814	-57.28814	3281.93107	0	0	28
14	20	0	25	-0.460172	67.68529	-42.68529	1822.03405	0	0	32
15	10	0	30	-1.201201	60.34035	-30.34035	920.536861	-12	0	49
16	12	0	20	0.829949	54.61396	-34.61396	1198.12617	-12	0	69
17	8	0	20	0.118655	46.14512	-26.14512	683.567446	-24	0	89
18	8	0	20	-1.091907	43.38305	-23.38305	546.767164	-16	0	93
19	8	0	20	0.059141	43.75835	-23.75835	564.459026	-6	0	95
20	8	0	30	-1.027268	39.12043	-9.120429	83.1822265	2	2	99
21	8	0	30	0.005864	30.39602	-0.396019	0.15683134	4	4	119
22	8	0	30	0.617955	21.25057	8.7494318	76.5525566	6	6	139
23	10	0	8	-2.387216	8.487855	-0.487855	0.23800281	8	8	159
24	10	0	0	-0.902098	4.627499	-4.627499	21.4137435	18	18	147
25	10	0	0	-0.04908	3.238059	-3.238059	10.4850259	28	28	127
26	10	0	0	-0.636776	0	0	0	48	48	97
27	5	0	0	2.195198	0	0	0	68	68	67
28	3	0	0	0.068725	0	0	0	113	113	17
29	0	0	0	0.546506	0	0	0	127	127	0
30	0	0	0	1.324384	0	0	0	127	127	0
31	0	0	0	-1.581484	0	0	0	127	127	0
32	0	0	0	-2.165472	0	0	0	127	127	0
33	0	0	0	-0.10934	0	0	0	127	127	0
34	0	0	0	-0.099013	0	0	0	127	127	0
35	0	0	0	-1.214317	0	0	0	127	127	0
36	0	0	0	0.792884	0	0	0	127	127	0
37	0	0	0	1.244444	0	0	0	127	127	0
38	5	0	0	1.435767	0	0	0	127	127	0
39	5	0	0	0.161802	0	0	0	122	122	0
40	5	0	0	-1.340106	0	0	0	117	117	0
	mean of the disturbance			-0.12672		-26.5309	mean of the standard errors			
	std dev of the disturbance			1.080545						

Σ (AO-Ot)2	108.8462		constraints		
θ	0.00		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.39		>=0	<=1	
S'	80.55		>=0	<=100	
	Standard GRG NonLinear				

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.245458	4	0.379597	3.86858	0.1314203	0.01727129	12	12	12
2	4	0.475854	4	0.415663	4.135041	-0.135041	0.01823616	12	12	12
3	4	0.692111	8	0.690579	4.626215	3.3737849	11.3824245	12	12	12
4	6	0.895098	8	-1.95185	2.186773	5.8132274	33.7936133	12	12	16
5	5	1.208358	12	-1.757178	2.768422	9.2315785	85.2220415	10	10	20
6	8	1.44103	10	0.942744	5.737873	4.2621267	18.165724	9	9	28
7	10	1.843518	6	0.897853	6.095471	-0.095471	0.00911469	9	9	30
8	8	2.344036	6	0.379597	6.151449	-0.151449	0.0229369	7	7	28
9	7	2.691112	4	0.415663	6.387158	-2.387158	5.6985221	11	11	22
10	8	2.955525	4	0.690579	6.815912	-2.815912	7.92936103	14	14	16
11	8	3.265076	0	-1.95185	4.556751	-4.556751	20.7639779	12	12	14
12	8	3.555633	16	-1.757178	5.115696	10.884304	118.468069	10	10	8
13	12	3.828359	18	0.305266	7.598299	10.401701	108.195378	6	6	20
14	12	4.329808	16	1.666641	9.682272	6.3177276	39.9136816	-2	0	34
15	25	4.800485	30	-2.845784	5.640525	24.359475	593.384036	-14	0	50
16	30	6.040018	20	-0.172837	9.553005	10.446995	109.139698	-23	0	64
17	20	7.510311	30	0.291469	11.4876	18.512397	342.708831	-35	0	66
18	20	8.276734	40	0.736749	12.69931	27.300693	745.327852	-39	0	80
19	20	8.996127	24	-0.644415	12.03753	11.962465	143.100569	-49	0	110
20	20	9.671374	50	-0.746448	12.61075	37.389251	1397.95605	-59	0	124
21	30	10.30518	20	0.909799	14.90081	5.0991926	26.0017655	-69	0	164
22	30	11.51375	40	-1.045769	14.1538	25.846198	668.025969	-79	0	164
23	30	12.64815	20	0.297728	16.6317	3.3683015	11.3454553	-89	0	184
24	8	13.71293	20	0.680777	18.07954	1.9204639	3.68818175	-89	0	174
25	0	13.36236	12	0.268078	17.31627	-5.316265	28.2626758	-67	0	164
26	0	12.54239	12	0.05034	16.27855	-4.278552	18.3060104	-17	0	126
27	0	11.77273	0	-0.112656	13.761	-13.761	189.364986	43	43	78
28	0	11.0503	0	-0.600865	10.70745	-10.70745	114.649404	93	93	28
29	0	10.37221	0	0.413995	10.45448	-10.45448	109.296119	109	109	12
30	0	9.735722	0	-1.034495	7.927203	-7.927203	62.8405544	121	121	0
31	0	9.138294	0	-0.588854	7.777417	-7.777417	60.4882179	121	121	0
32	0	8.577527	0	-0.512302	7.291202	-7.291202	53.161632	121	121	0
33	0	8.051171	0	-0.991592	6.285557	-6.285557	39.508226	121	121	0
34	0	7.557115	100	0.614138	7.39723	92.60277	8575.27301	121	121	0
35	0	7.093377	56	0.3934	6.712754	49.287246	2429.23286	121	121	100
36	0	6.658095	0	-0.350562	5.53351	-5.53351	30.6197317	121	121	156
37	0	6.249525	0	-0.141524	5.333977	-5.333977	28.4513115	121	121	156
38	0	5.866026	0	0.140246	1.546424	-1.546424	2.39142832	221	221	56
39	0	5.50606	0	-0.995924	0	0	0	277	277	0
40	0	5.168183	0	1.842492	0.286767	-0.286767	0.08223544	277	277	0
	mean of the disturbance			-0.150612		7.8448691	mean of the standard errors			
	std dev of the disturbance			1.017031						

Σ (AO-Ot)2	12460.99		constraints		
θ	0.06		>=0	<=1	
αs	0.04		>=0	<=1	
β	0.00		>=0	<=1	
S'	100.00		>=0	<=100	
	GRG NonLinear				

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.604041	4	0.2959	19.17873	-15.17873	230.393946	12	12	8
2	4	1.116865	4	-1.220452	18.17521	-14.17521	200.93646	12	12	8
3	4	1.552248	8	1.841432	21.67247	-13.67247	186.936506	12	12	8
4	8	1.921884	10	0.794475	20.99515	-10.99515	120.893341	12	12	12
5	8	2.839741	16	-1.083104	21.35821	-5.358214	28.7104557	8	8	18
6	12	3.618993	12	-0.416267	22.8043	-10.8043	116.732962	8	8	26
7	10	4.884611	14	-1.636693	23.51089	-9.510887	90.4569631	6	6	28
8	6	5.657087	14	0.584446	24.52033	-10.52033	110.677255	12	12	26
9	6	5.70887	10	-0.57382	21.42967	-11.42967	130.637269	18	18	28
10	4	5.752834	4	0.215071	19.61695	-15.61695	243.889226	26	26	24
11	4	5.488138	6	1.659911	17.48114	-11.48114	131.816506	36	36	14
12	0	5.263414	4	2.48335	16.10468	-12.10468	146.523181	42	42	10
13	16	4.468585	2	1.386305	12.89002	-10.89002	118.592485	46	46	10
14	18	6.209946	2	1.171984	17.724	-15.724	247.244125	36	36	6
15	16	7.990365	10	-0.649153	22.31304	-12.31304	151.611052	22	22	4
16	30	9.199902	10	-0.319026	28.48245	-18.48245	341.601026	8	8	12
17	20	12.34093	20	-1.483127	33.10495	-13.10495	171.739639	-20	0	20
18	30	13.49753	20	-0.984827	34.75984	-14.75984	217.853014	-30	0	30
19	40	15.98957	30	-1.531911	36.7048	-6.704803	44.9543876	-50	0	40
20	24	19.61539	30	1.82715	43.68968	-13.68968	187.407464	-70	0	50
21	50	20.27751	50	0.056066	42.58072	7.4192787	55.0456971	-74	0	60
22	20	24.76591	60	-2.06137	44.95168	15.048316	226.4518	-94	0	80
23	40	24.04621	50	-1.697342	44.59601	5.4039885	29.2030913	-84	0	110
24	20	26.45539	50	-2.400564	46.30198	3.6980247	13.6753865	-74	0	110
25	20	25.48056	50	1.042563	48.77027	1.2297286	1.51223233	-34	0	100
26	12	24.65294	30	0.922471	47.82256	-17.82256	317.643606	-4	0	100
27	12	22.74222	30	0.870432	34.61613	-4.616131	21.3086624	34	34	80
28	0	21.12003	50	0.056066	19.61313	30.386869	923.361787	72	72	60
29	0	17.93069	10	-2.06137	4.395473	5.6145268	31.5229113	102	102	80
30	0	15.22298	2	-1.697342	0	2	4	132	132	60
31	0	12.92415	2	-2.400564	0	2	4	182	182	12
32	0	10.97247	2	1.042563	0	2	4	192	192	4
33	0	9.315516	0	0.922471	0	0	0	194	194	4
34	0	7.908778	0	0.870432	0	0	0	196	196	2
35	100	6.714472	0	0.056066	0	0	0	198	198	0
36	56	20.80154	0	-2.06137	8.579104	-8.579104	73.6010253	98	98	0
37	0	26.11687	23	-1.697342	32.77744	-9.777437	95.5982679	42	42	0
38	0	22.17295	11	-2.400564	28.1303	-17.1303	293.447216	42	42	23
39	0	18.82461	25	1.042563	28.22509	-3.225085	10.4011747	42	42	34
40	0	15.9819	10	0.922471	17.65628	-7.656277	58.6185734	65	65	36
	mean of the disturbance			-0.117909		-5.547271	mean of the standard errors			
	std dev of the disturbance			1.356975						

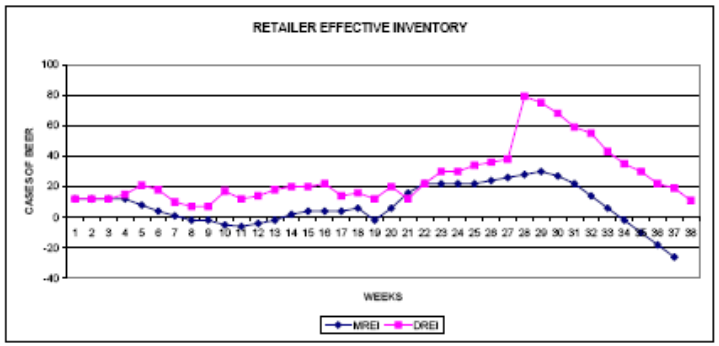
Σ (AO-Ot)2	2163.391
θ	0.15
αs	0.33
β	0.00
S'	67.27
	GRG NonLinear

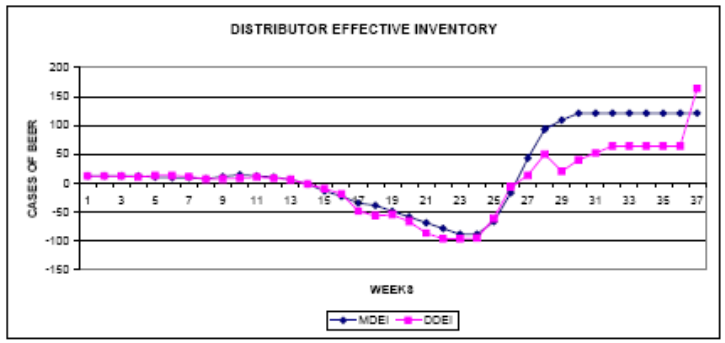
constraints		
>=0	<=1	
>=0	<=1	
>=0	<=1	
>=0	<=100	

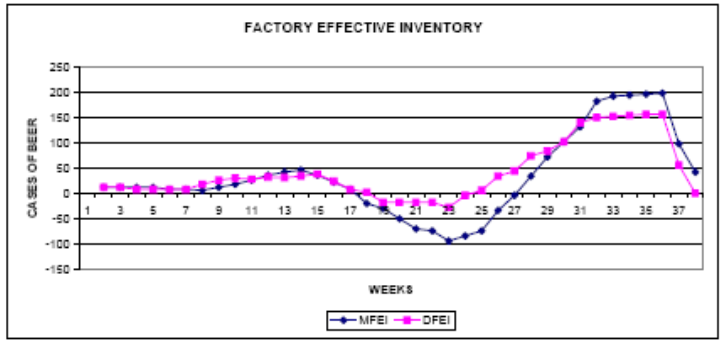
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

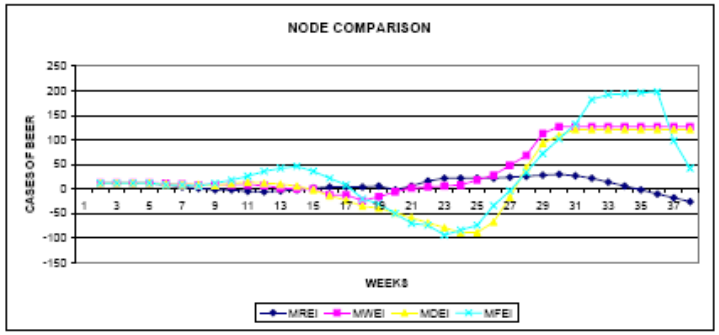
HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40

MODEL CHARTS

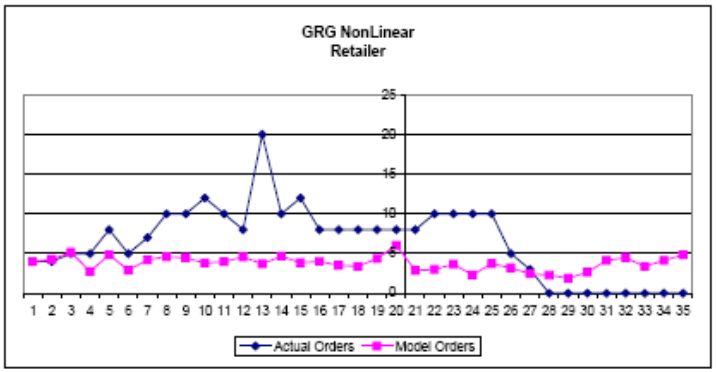


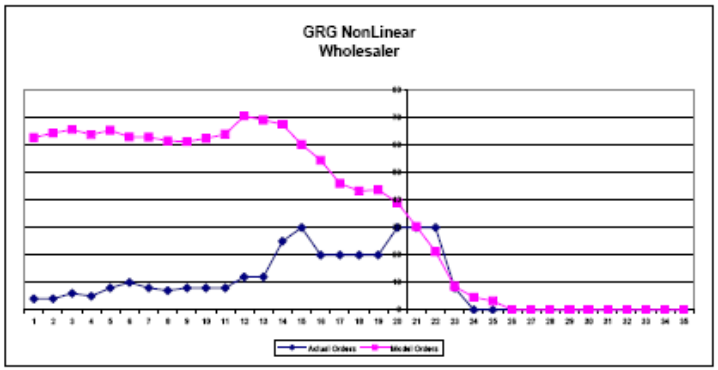


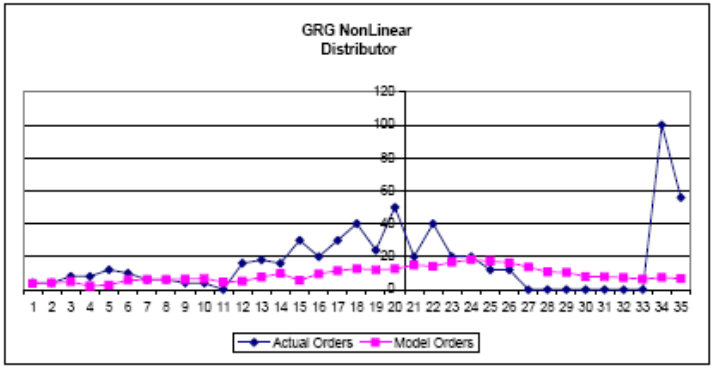


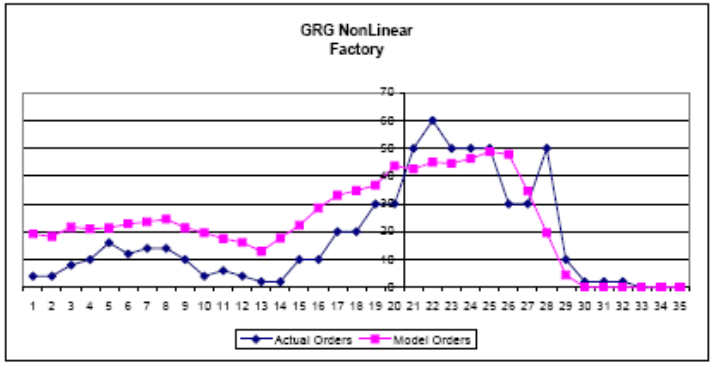


HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40 ORDER CHARTS









HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

HIRES ROOT BEER	NO IT							HIRES ROOT BEER		Retailer	NO IT					
Team Costs	$ 4,597.50								Costs	$ 389.00						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	5	4	12		16	4
4	4	16	4	4	0	4	12	12	*15*	24	5	5	13		16	4
5	8	16	4	5	0	8	8	8	*21*	28	8	5	14		16	4
6	8	12	5	5	0	8	4	4	*18*	30	5	8	18		15	6
7	8	9	5	8	0	8	1	1	*10*	30.5	7	5	18		16	5
8	8	6	8	5	2	6	0	-2	*7*	32.5	10	7	20		13	8
9	8	8	5	7	2	8	0	-2	*7*	34.5	10	10	22		16	10
10	8	5	7	10	5	5	0	-5	*17*	39.5	12	10	27		19	8
11	8	7	10	10	6	7	0	-6	*12*	45.5	10	12	32		17	7
12	8	10	10	12	4	10	0	-4	*14*	49.5	8	10	32		14	8
13	8	10	12	10	2	10	0	-2	*18*	51.5	20	8	30		10	8
14	8	12	10	8	0	10	2	2	*20*	52.5	10	20	38		8	8
15	8	12	8	8	0	8	4	4	*20*	54.5	12	10	38		8	10
16	8	12	8	10	0	8	4	4	*22*	56.5	8	12	42		10	0
17	8	12	10	0	0	8	4	4	*14*	58.5	8	8	42		0	16
18	8	14	0	16	0	8	6	6	*16*	61.5	8	8	40		16	18
19	8	6	16	18	2	6	0	-2	*12*	63.5	8	8	48		18	16
20	8	16	18	14	0	10	6	6	*20*	66.5	8	8	40		16	10
21	8	24	14	8	0	8	16	16	*12*	74.5	8	8	30		12	10
22	8	30	8	8	0	8	22	22	*22*	85.5	10	8	24		14	10
23	8	30	8	8	0	8	22	22	*30*	96.5	10	10	26		16	20
24	8	30	8	10	0	8	22	22	*30*	107.5	10	10	28		28	20
25	8	30	10	10	0	8	22	22	*34*	118.5	10	10	30		38	30
26	8	32	10	10	0	8	24	24	*36*	130.5	5	10	30		58	30
27	8	34	10	10	0	8	26	26	*38*	143.5	3	5	25		78	50
28	8	36	10	5	0	8	28	28	*79*	157.5	0	3	18		118	17
29	8	38	5	3	0	8	30	30	*75*	172.5	0	0	8		130	0
30	8	35	3	0	0	8	27	27	*68*	186	0	0	3		127	0
31	8	30	0	0	0	8	22	22	*59*	197	0	0	0		127	0
32	8	22	0	0	0	8	14	14	*55*	204	0	0	0		127	0
33	8	14	0	0	0	8	6	6	*43*	207	0	0	0		127	0
34	8	6	0	0	2	6	0	-2	*35*	209	0	0	0		127	0
35	8	0	0	0	10	0	0	-10	*30*	219	0	0	0		127	0
36	8	0	0	0	18	0	0	-18	*22*	237	0	0	0		127	0
37	8	0	0	0	26	0	0	-26	*19*	263	5	0	0		127	0
38	8	0	0	0	34	0	0	-34	*11*	297	5	5	5		127	0
39	8	0	0	5	42	0	0	-42	*11*	339	5	5	10		127	0
40	8	0	5	5	50	0	0	-50	*8*	389	5	5	15		122	0

HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

	STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews						
HIF				HIRES ROOT BEER		Wholesaler		NO IT								HIRES ROOT BEER	
					Costs	$ 1,028.00											Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*11*	18	6	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*10*	24	5	6	14		16	4	4	0	12	12	*10*
5	6	0	11	11	*8*	29.5	8	5	15		16	4	8	0	10	10	*13*
6	5	0	10	10	*4*	34.5	10	8	19		14	8	8	0	9	9	*13*
7	8	0	8	8	*2*	38.5	8	10	23		17	8	12	0	9	9	*11*
8	10	0	8	8	*0*	42.5	7	8	26		17	12	10	0	7	7	*7*
9	8	0	9	9	*12*	47	8	7	25		19	10	6	0	11	11	*7*
10	7	0	9	9	*10*	51.5	8	8	23		21	6	6	0	14	14	*8*
11	8	0	7	7	*5*	55	8	8	23		20	6	4	0	12	12	*10*
12	8	0	2	2	*2*	56	12	8	24		18	4	4	0	10	10	*8*
13	8	0	0	0	*2*	56	12	12	28		14	4	0	0	6	6	*6*
14	10	0	0	0	*-10*	56	25	12	32		10	0	16	2	0	-2	*-2*
15	0	12	0	-12	*-14*	68	30	25	49		0	16	18	14	0	-14	*-10*
16	16	12	0	-12	*-16*	80	20	30	69		16	18	16	23	0	-23	*-19*
17	18	24	0	-24	*-20*	104	20	20	89		18	16	10	35	0	-35	*-49*
18	16	16	0	-16	*-12*	120	20	20	93		16	10	10	39	0	-39	*-57*
19	10	6	0	-6	*-20*	126	20	20	95		10	10	10	49	0	-49	*-55*
20	10	0	2	2	*-12*	127	30	20	99		10	10	20	59	0	-59	*-67*
21	10	0	4	4	*-6*	129	30	30	119		10	20	20	69	0	-69	*-87*
22	20	0	6	6	*-2*	132	30	30	139		20	20	30	79	0	-79	*-97*
23	20	0	8	8	*7*	136	8	30	159		20	30	30	89	0	-89	*-97*
24	30	0	18	18	*17*	145	0	8	147		30	30	50	89	0	-89	*-96*
25	30	0	28	28	*38*	159	0	0	127		30	50	60	67	0	-67	*-61*
26	50	0	48	48	*21*	183	0	0	97		50	60	50	17	0	-17	*-7*
27	17	0	68	68	*64*	217	0	0	67		60	50	16	0	43	43	*13*
28	0	0	113	113	*124*	273.5	0	0	17		93	16	12	0	93	93	*50*
29	0	0	127	127	*141*	337	0	0	0		109	12	0	0	109	109	*20*
30	0	0	127	127	*141*	400.5	0	0	0		121	0	0	0	121	121	*40*
31	0	0	127	127	*141*	464	0	0	0		121	0	0	0	121	121	*52*
32	0	0	127	127	*141*	527.5	0	0	0		121	0	0	0	121	121	*64*
33	0	0	127	127	*141*	591	0	0	0		121	0	0	0	121	121	*64*
34	0	0	127	127	*141*	654.5	0	0	0		121	0	0	0	121	121	*64*
35	0	0	127	127	*136*	718	0	0	0		121	0	0	0	121	121	*64*
36	0	0	127	127	*136*	781.5	0	0	0		121	0	100	0	121	121	*64*
37	0	0	127	127	*128*	845	0	0	0		121	100	56	0	121	121	*164*
38	0	0	127	127	*123*	908.5	0	0	0		221	56	0	0	221	221	*220*
39	0	0	122	122	*118*	969.5	0	0	0		277	0	0	0	277	277	*220*
40	0	0	117	117	*113*	1028	0	0	0		277	0	0	0	277	277	*220*

HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	HIF Distributor		NO IT								HIRES ROOT BEER		Factory	NO IT	
	$ 1,693.00											Costs	$ 1,487.50		
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL
0	0	4	4	12		12	4	4	0	12			0	4	8
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8
3	18	8	4	12		16	4	4	0	12	12	*8*	18	8	8
4	24	8	8	16		16	4	8	0	12	12	*8*	24	10	12
5	29	12	8	20		16	8	10	0	8	8	*8*	28	16	18
6	33.5	10	12	28		16	10	16	0	8	8	*8*	32	12	26
7	38	6	10	30		18	16	12	0	6	6	*18*	35	14	28
8	41.5	6	6	28		22	12	14	0	12	12	*26*	41	14	26
9	47	4	6	22		24	14	14	0	18	18	*30*	50	10	28
10	54	4	4	16		32	14	10	0	26	26	*28*	63	4	24
11	60	0	4	14		40	10	4	0	36	36	*32*	81	6	14
12	65	16	0	8		46	4	6	0	42	42	*31*	102	4	10
13	68	18	16	20		46	6	4	0	46	46	*34*	125	2	10
14	70	16	18	34		52	4	2	0	36	36	*38*	143	2	6
15	84	30	16	50		40	2	2	0	22	22	*24*	154	10	4
16	107	20	30	64		24	2	10	0	8	8	*8*	158	10	12
17	142	30	20	66		10	10	10	20	0	-20	*2*	178	20	20
18	181	40	30	80		10	10	20	30	0	-30	*-18*	208	20	30
19	230	24	40	110		10	20	20	50	0	-50	*-18*	258	30	40
20	289	50	24	124		20	20	30	70	0	-70	*-18*	328	30	50
21	358	20	50	164		20	30	30	74	0	-74	*-18*	402	50	60
22	437	40	20	164		30	30	50	94	0	-94	*-28*	496	60	80
23	526	20	40	184		30	50	60	84	0	-84	*-4*	580	50	110
24	615	20	20	174		50	60	50	74	0	-74	*6*	654	50	110
25	682	12	20	164		60	50	50	34	0	-34	*34*	688	50	100
26	699	12	12	126		50	50	50	4	0	-4	*44*	692	30	100
27	720.5	0	12	78		50	50	30	0	34	34	*74*	709	30	80
28	767	0	0	28		84	30	30	0	72	72	*84*	745	50	60
29	821.5	0	0	12		102	30	50	0	102	102	*102*	796	10	80
30	882	0	0	0		132	50	10	0	132	132	*140*	862	2	60
31	942.5	0	0	0		182	10	2	0	182	182	*150*	953	2	12
32	1003	0	0	0		192	2	2	0	192	192	*152*	1049	2	4
33	1063.5	0	0	0		194	2	2	0	194	194	*154*	1148	0	4
34	1124	100	0	0		196	2	0	0	196	196	*156*	1244	0	2
35	1184.5	56	100	100		198	0	0	0	198	198	*156*	1343	0	0
36	1245	0	56	156		198	0	0	0	98	98	*56*	1392	0	0
37	1305.5	0	0	156		98	0	0	0	42	42	*0*	1413	23	0
38	1416	0	0	56		42	0	23	0	42	42	*0*	1434	11	23
39	1554.5	0	0	0		42	23	11	0	42	42	*23*	1455	25	34
40	1693	0	0	0		65	11	25	0	65	65	*33*	1487.5	10	36

HIRES ROOT BEER GAME MODEL WEEKS 21 TO 40 MODEL DATA

HIRES ROOT BEER NO IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	5	12	6	11	8	12	8	8
4	5	15	5	10	8	10	10	8
5	8	21	8	8	12	13	16	8
6	5	18	10	4	10	13	12	8
7	7	10	8	2	6	11	14	18
8	10	7	7	0	6	7	14	26
9	10	7	8	12	4	7	10	30
10	12	17	8	10	4	8	4	28
11	10	12	8	5	0	10	6	32
12	8	14	12	2	16	8	4	31
13	20	18	12	2	18	6	2	34
14	10	20	25	-10	16	-2	2	38
15	12	20	30	-14	30	-10	10	24
16	8	22	20	-16	20	-19	10	8
17	8	14	20	-20	30	-49	20	2
18	8	16	20	-12	40	-57	20	-18
19	8	12	20	-20	24	-55	30	-18
20	8	20	30	-12	50	-67	30	-18
21	8	12	30	-6	20	-87	50	-18
22	10	22	30	-2	40	-97	60	-28
23	10	30	8	7	20	-97	50	-4
24	10	30	0	17	20	-96	50	6
25	10	34	0	38	12	-61	50	34
26	5	36	0	21	12	-7	30	44
27	3	38	0	64	0	13	30	74
28	0	79	0	124	0	50	50	84
29	0	75	0	141	0	20	10	102
30	0	68	0	141	0	40	2	140
31	0	59	0	141	0	52	2	150
32	0	55	0	141	0	64	2	152
33	0	43	0	141	0	64	0	154
34	0	35	0	141	100	64	0	156
35	0	30	0	136	56	64	0	156
36	0	22	0	136	0	64	0	56
37	5	19	0	128	0	164	23	0
38	5	11	0	123	0	220	11	0
39	5	11	0	118	0	220	25	23
40	5	8	0	113	0	220	10	33

LONESTAR GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.154416	0	4	16	12	12	12
2	4	0.04	4	-0.665985	0	4	16	12	12	12
3	4	0.08	6	-0.05814	0	6	36	12	12	12
4	4	0.12	4	0.717213	0.283138	3.7168621	13.8150638	12	12	14
5	8	0.16	4	2.171013	3.993548	0.0064523	4.1633E-05	8	8	14
6	8	0.24	8	-1.096223	3.023018	4.9769816	24.7703463	4	4	14
7	8	0.32	6	0.14198	5.448458	0.5515416	0.30419816	2	2	16
8	8	0.40	6	-1.662125	4.830795	1.1692048	1.36703983	-2	0	18
9	8	0.47	8	-1.008845	5.561062	2.4389375	5.94841615	-6	0	20
10	8	0.55	10	-0.181543	6.464573	3.5354271	12.4992451	-6	0	20
11	8	0.62	8	-0.242194	6.479359	1.5206406	2.3123477	-8	0	24
12	8	0.70	10	-0.867531	5.928696	4.0713042	16.5755176	-10	0	26
13	8	0.77	10	0.047029	6.917173	3.082827	9.50382282	-10	0	28
14	8	0.85	10	-0.734036	6.209278	3.7907224	14.3686783	-8	0	28
15	8	0.92	10	-0.484069	6.531673	3.4683274	12.0292951	-8	0	30
16	8	0.99	10	-0.506707	6.58073	3.4192704	11.6914103	-6	0	30
17	8	1.06	10	-0.986039	6.172367	3.8276333	14.6507769	-4	0	30
18	8	1.13	10	1.774595	9.003252	0.9967483	0.99350727	-2	0	30
19	8	1.20	6	0.331517	7.629714	-1.629714	2.65596762	0	0	30
20	8	1.27	6	0.65131	8.018342	-2.018342	4.07370611	-3	0	31
21	8	1.34	6	-1.031368	6.403803	-0.403803	0.16305682	-7	0	33
22	8	1.40	8	-0.447473	7.055147	0.9448531	0.89274747	-9	0	33
23	8	1.47	8	-0.151913	7.417473	0.5825268	0.33933753	-7	0	31
24	8	1.54	6	0.633649	8.269125	-2.269125	5.14892992	-7	0	31
25	8	1.60	8	0.276885	7.977783	0.0222173	0.00049361	-9	0	31
26	8	1.67	6	2.030143	9.795799	-3.795799	14.4080881	-9	0	31
27	8	1.73	8	-0.139767	7.689993	0.3100072	0.09610449	-9	0	29
28	8	1.80	10	-0.467876	7.425338	2.5746622	6.62888567	-9	0	29
29	8	1.86	10	0.90896	8.864986	1.1350142	1.2882573	-11	0	33
30	8	1.92	10	-0.010964	8.007238	1.9927622	3.97110114	-7	0	31
31	8	1.98	10	1.383095	9.462843	0.5371574	0.28853802	-7	0	33
32	8	2.04	10	-0.008895	8.131776	1.8682239	3.49026054	-10	0	38
33	8	2.10	8	-0.063971	8.137008	-0.137008	0.01877109	-3	0	33
34	8	2.16	6	-1.698846	6.561828	-0.561828	0.31566117	-2	0	32
35	8	2.22	6	-0.727725	7.592041	-1.592041	2.53459534	0	0	28
36	9	2.28	6	-2.049899	5.219695	0.7803053	0.60887631	2	2	24
37	10	2.35	8	1.033019	8.370638	-0.370638	0.13737225	2	2	22
38	11	2.43	8	0.38054	8.904285	-0.904285	0.8177319	0	0	24
39	12	2.51	8	0.028821	8.639366	-0.639366	0.40878899	0	0	24
40	13	2.61	10	1.292552	9.999141	0.0008588	7.3758E-07	0	0	24
	mean of the disturbance			-0.057727		1.4995041	mean of the standard errors			
	std dev of the disturbance			0.929899						

			constraints		
Σ (AO-Ot)2	41.55759				
θ	0.01		>=0	<=1	
αs	0.55		>=0	<=1	
β	0.00		>=0	<=1	
S'	11.00		>=0	<=100	INT

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

LONESTAR GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.533676	4	1.7319	2.265575	1.7344246	3.00822859	12	12	12
2	4	0.996149	4	1.399065	2.395214	1.6047862	2.57533887	12	12	12
3	4	1.39692	6	-1.25361	0.14331	5.8566901	34.3008187	12	12	12
4	6	1.74422	4	-0.254401	1.489819	2.5101806	6.30100686	12	12	14
5	4	2.312022	6	-0.247477	2.064544	3.9354556	15.4878109	10	10	14
6	4	2.53723	8	-0.455735	2.081495	5.9185048	35.0286991	10	10	16
7	8	2.732391	10	0.008949	2.739341	7.2606595	52.7171763	12	12	18
8	6	3.43519	12	-0.63034	2.80485	9.1951497	84.5507779	8	8	24
9	6	3.777384	10	1.820178	5.597562	4.4024376	19.3814571	8	8	30
10	8	4.073923	6	1.630399	5.704322	0.2956779	0.0874254	10	10	32
11	10	4.597736	6	0.111647	4.709384	1.2906161	1.66568988	12	12	28
12	8	5.318501	12	-0.846729	4.471772	7.5282278	56.6742134	14	14	22
13	10	5.676264	8	0.144824	5.821087	2.1789128	4.74766089	16	16	24
14	10	6.253132	8	-1.35386	4.899272	3.1007276	9.61451186	12	12	26
15	10	6.753035	6	-0.2348	6.518235	-0.518235	0.26856787	8	8	28
16	10	7.186242	8	-2.191945	4.994297	3.0057032	9.0342515	10	10	22
17	10	7.561651	10	1.103523	8.665174	1.3348263	1.78176128	3	3	27
18	10	7.886973	8	-0.520866	7.366106	0.6338936	0.4018211	-5	0	35
19	10	8.168891	10	-0.846729	7.322162	2.6778381	7.17081691	-11	0	39
20	6	8.413195	12	0.144824	8.558019	3.4419812	11.8472347	-15	0	43
21	6	8.091229	6	-1.35386	6.73737	-0.73737	0.54371387	-11	0	45
22	6	7.81222	8	-0.2348	7.57742	0.4225803	0.1785741	-9	0	43
23	8	7.570435	8	-2.191945	5.37849	2.6215099	6.87231411	-9	0	45
24	8	7.627747	6	1.103523	8.73127	-2.73127	7.45983792	-9	0	45
25	6	7.677413	10	-0.520866	7.156547	2.8434534	8.08522708	-9	0	43
26	8	7.453614	8	-0.846729	6.606886	1.3931144	1.94076786	-7	0	45
27	6	7.526512	10	0.144824	7.671336	2.328664	5.42267623	-9	0	47
28	8	7.322847	6	-1.35386	5.968987	0.031013	0.0009618	-3	0	45
29	10	7.413192	10	-0.2348	7.178392	2.8216081	7.96147237	-3	0	43
30	10	7.758321	10	-2.191945	5.566376	4.433624	19.657022	-8	0	48
31	10	8.057404	8	1.103523	9.160927	-1.160927	1.34775064	-3	0	43
32	10	8.316583	8	-0.520866	7.795716	0.2042835	0.04173175	-4	0	42
33	10	8.541182	6	-0.846729	7.694454	-1.694454	2.8711739	-4	0	40
34	8	8.735816	7	0.144824	8.88064	-1.88064	3.53680663	-4	0	36
35	6	8.637845	6	-1.35386	7.283785	-1.283785	1.64810355	-4	0	35
36	6	8.285733	4	0.026811	8.312544	-4.312544	18.5980358	-4	0	35
37	6	7.980773	5	1.258274	9.239046	-4.239046	17.9695148	-2	0	31
38	8	7.7165	8	1.785998	9.502498	-1.502498	2.25749982	0	0	28
39	8	7.754324	6	-0.948051	6.806273	-0.806273	0.65007659	-3	0	31
40	8	7.787102	8	-1.088073	6.699029	1.3009711	1.69252579	-2	0	28
	mean of the disturbance			-0.282764		2.1428532	mean of the standard errors			
	std dev of the disturbance			1.081592						

Σ (AO-Ot)2	108.7358		constraints		
θ	0.13		>=0	<=1	
αs	0.00		>=0	<=1	
β	0.00		>=0	<=1	
S'	0.00		>=0	<=100	INT

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

LONESTAR GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	2.057824	4	-0.247002	1.574405	2.4255954	5.88351295	12	12	12
2	4	3.056988	4	1.111074	3.931645	0.0683549	0.00467239	12	12	12
3	4	3.542126	6	0.265825	3.571534	2.4284659	5.89744667	12	12	12
4	6	3.777682	8	-0.484326	3.037238	4.9627623	24.6290094	12	12	14
5	4	4.920967	6	0.923178	5.568325	0.4316745	0.18634292	10	10	18
6	6	4.44717	10	-0.225013	3.926636	6.073364	36.8857508	10	10	20
7	8	5.246033	12	0.13773	5.048839	6.9511613	48.318643	10	10	24
8	10	6.662827	15	1.202202	7.490702	7.5092975	56.3895494	10	10	28
9	12	8.379656	2	-0.069958	7.886118	-5.886118	34.6463803	6	6	37
10	10	10.24216	2	-0.067508	9.849582	-7.849582	61.6159431	4	4	29
11	6	10.11758	2	1.1112	10.98251	-8.982514	80.6855509	4	4	21
12	6	7.999267	2	-2.385819	5.406583	-3.406583	11.604809	8	8	13
13	12	6.970732	4	-0.473977	6.329293	-2.329293	5.42560553	11	11	6
14	8	9.558069	6	0.035374	9.504787	-3.504787	12.2835289	1	1	8
15	8	8.756511	10	1.27837	9.916673	0.0833269	0.00694337	-5	0	12
16	6	8.367319	8	-0.676212	7.494094	0.5059064	0.25594126	-11	0	20
17	8	7.149438	6	0.141946	7.054967	-1.054967	1.11295594	-13	0	24
18	10	7.587015	8	-1.190505	6.160093	1.8399072	3.38525835	-15	0	24
19	8	8.828389	8	-0.351055	8.260619	-0.260619	0.06792207	-15	0	22
20	10	8.402219	8	-0.622006	7.563498	0.4365018	0.19053381	-15	0	22
21	12	9.224207	6	1.371303	10.35909	-4.359094	19.0016984	-19	0	24
22	6	10.65223	12	-0.406419	10.0291	1.9709046	3.88446485	-23	0	22
23	8	8.258863	8	-0.970203	7.032541	0.9674587	0.9359763	-21	0	26
24	8	8.125689	9	-0.589611	7.27996	1.7200402	2.95853845	-21	0	26
25	6	8.061028	12	0.266148	8.041505	3.9584946	15.6696798	-23	0	29
26	10	7.00072	8	0.913728	7.628778	0.3712225	0.13780613	-17	0	29
27	8	8.543717	10	0.316746	8.574793	1.4252066	2.03121385	-19	0	29
28	10	8.263999	10	0.795037	8.724112	1.2758883	1.62789101	-22	0	34
29	6	9.157095	8	-1.377501	7.493924	0.506076	0.25611295	-17	0	29
30	10	7.532909	6	-0.052199	7.20489	-1.20489	1.45176001	-14	0	28
31	10	8.802118	8	-0.535513	8.030189	-0.030189	0.00091135	-14	0	24
32	8	9.418376	8	0.902466	10.10413	-2.104127	4.42734875	-14	0	22
33	8	8.688684	8	-0.025065	8.446904	-0.446904	0.19972312	-14	0	22
34	6	8.334386	6	-0.934013	7.163956	-1.163956	1.35479384	-16	0	24
35	7	7.133447	6	0.439679	7.355411	-1.355411	1.83713885	-14	0	22
36	6	7.064795	5	1.258274	8.126054	-3.126054	9.77221561	-13	0	20
37	4	6.517005	5	-1.322396	4.997594	0.0024056	5.787E-06	-14	0	20
38	5	5.222117	5	1.069405	6.13391	-1.13391	1.28575243	-9	0	16
39	8	5.107847	5	-1.241794	3.718293	1.2817072	1.64277326	-8	0	15
40	6	6.595733	5	0.141214	6.589186	-1.589186	2.52551139	-11	0	15
	mean of the disturbance			-0.013511		0.0563594	mean of the standard errors			
	std dev of the disturbance			0.843704						

Σ (AO-Ot)2	71.00131		constraints		
θ	0.51		>=0	<=1	
αs	0.01		>=0	<=1	
β	1.00		>=0	<=1	
S'	0.00		>=0	<=100	INT
	GRG NonLinear				

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

LONESTAR GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	-2.290003	0.327465	3.6725348	13.4875115	12	12	8
2	4	4	4	-1.349261	1.268207	2.7317929	7.46269251	12	12	8
3	4	4	0	-0.045087	2.572381	-2.572381	6.61714172	12	12	8
4	6	4	6	0.369153	4.380953	1.6190465	2.62131164	12	12	4
5	8	6	8	-0.169816	6.08224	1.9177602	3.67780419	10	10	6
6	6	8	10	-0.889105	8.323973	1.6760269	2.80906617	2	2	14
7	10	6	10	-0.724693	5.094052	4.9059475	24.0683211	2	2	18
8	12	10	10	-0.627018	9.431983	0.5680167	0.32264282	0	0	20
9	15	12	12	-0.757398	11.3016	0.6983973	0.48775878	-2	0	20
10	2	15	15	0.724461	15.0863	-0.086296	0.00744683	-7	0	22
11	2	2	6	-1.865115	0	6	36	1	1	27
12	2	2	0	-1.214404	0	0	0	11	11	21
13	2	2	0	0.080862	0	0	0	24	24	6
14	4	2	0	-0.26075	0	0	0	28	28	0
15	6	4	0	-0.207698	0	0	0	24	24	0
16	10	6	10	0.582056	5.175924	4.8240761	23.2717107	18	18	0
17	8	10	10	0.624549	10.41989	-0.419894	0.1761429	8	8	10
18	6	8	10	-2.290003	5.768998	4.2310017	17.9013752	0	0	20
19	8	6	8	-1.349261	2.834897	5.1651032	26.6782908	4	4	20
20	8	8	10	-0.045087	5.898815	4.1011852	16.8197202	6	6	18
21	8	8	10	0.369153	5.375634	4.6243663	21.3847636	8	8	18
22	6	8	3	-0.169816	4.139498	-1.139498	1.29845652	8	8	20
23	12	6	0	-0.350581	2.523971	-2.523971	6.37043075	12	12	13
24	8	12	15	-0.125093	13.17271	1.8272885	3.33898321	10	10	3
25	9	8	10	-0.649616	6.808746	3.1912539	10.1841017	5	5	15
26	12	9	10	-0.569722	6.746364	3.2536363	10.5861489	-4	0	25
27	8	12	10	0.041273	12.10027	-2.100274	4.41115261	-1	0	20
28	10	8	10	-0.154884	7.435406	2.5645941	6.57714291	1	1	20
29	10	10	8	-1.029942	8.580348	-0.580348	0.31399018	1	1	20
30	8	10	10	-0.350581	9.936875	0.063125	0.00398476	1	1	18
31	6	8	6	-0.125093	7.224941	-1.224941	1.50048089	3	3	18
32	8	6	0	-0.649616	4.460163	-4.460163	19.8930539	5	5	16
33	8	8	10	-0.569722	9.088466	0.9115336	0.8308935	7	7	6
34	8	8	10	0.041273	9.242551	0.757449	0.57372895	5	5	10
35	6	8	6	-0.154884	7.904117	-1.904117	3.62566054	-3	0	20
36	6	6	6	0.30277	7.287393	-1.287393	1.65737981	1	1	16
37	5	6	6	0.451212	6.955323	-0.955323	0.91264207	5	5	12
38	5	5	6	-1.185946	3.849455	2.1505451	4.62484423	6	6	12
39	5	5	5	-1.067157	3.499532	1.5004677	2.25140318	7	7	12
40	5	5	0	0.539262	4.985824	-4.985824	24.8584389	8	8	11
	mean of the disturbance			-0.46147		1.2089272	mean of the standard errors			
	std dev of the disturbance			0.73764						

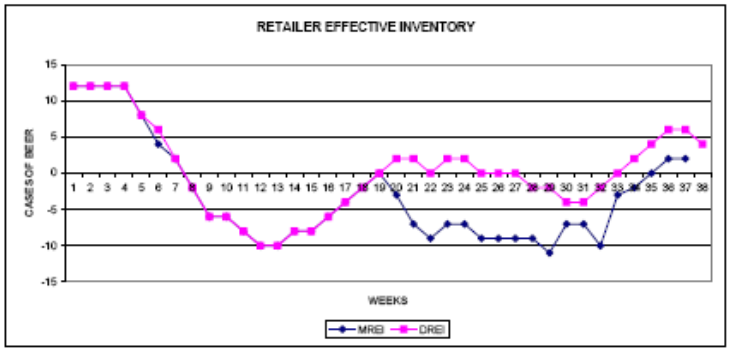
Σ (AO-Ot)2	125.1977		constraints		
θ	1.00		>=0	<=1	
αs	0.47		>=0	<=1	
β	0.74		>=0	<=1	
S'	15.00		>=0	<=100	INT

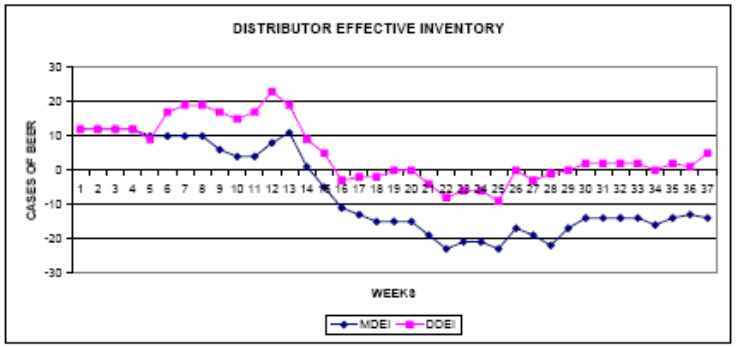
GRG NonLinear

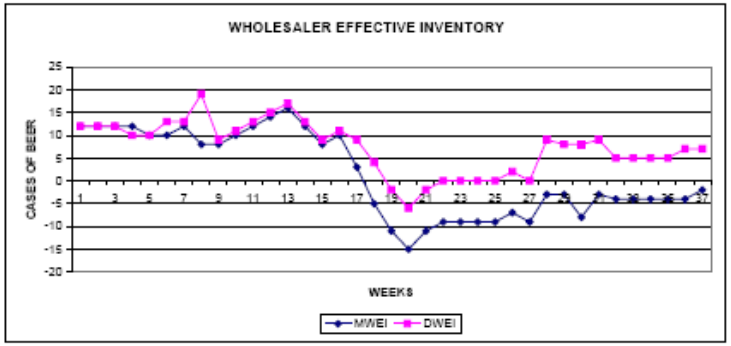
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

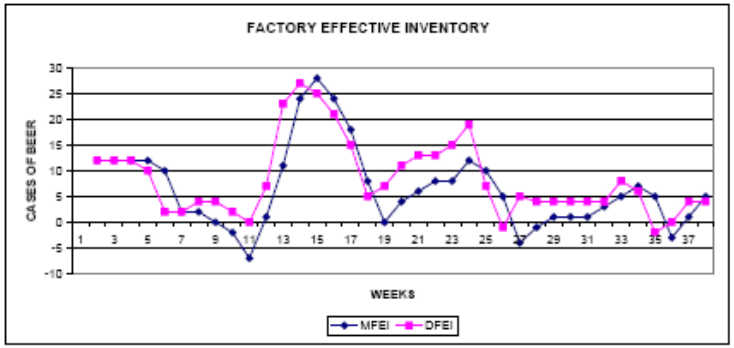
LONESTAR GAME MODEL WEEKS 21 TO 40

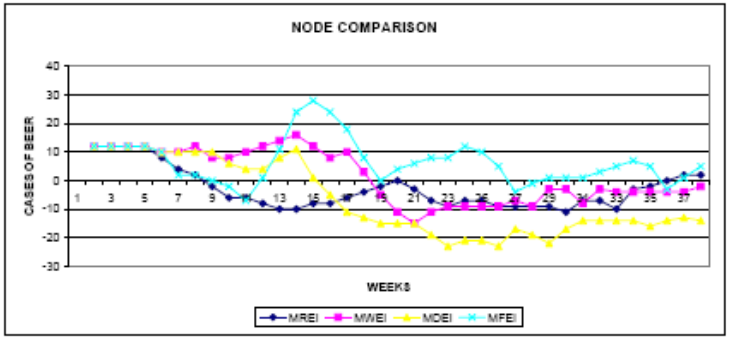
MODEL CHARTS



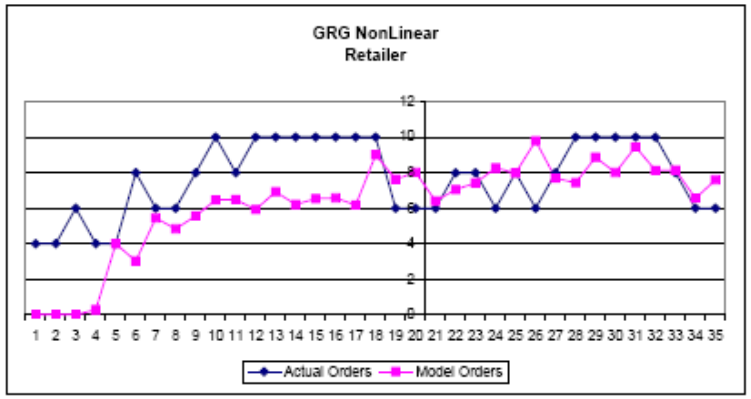


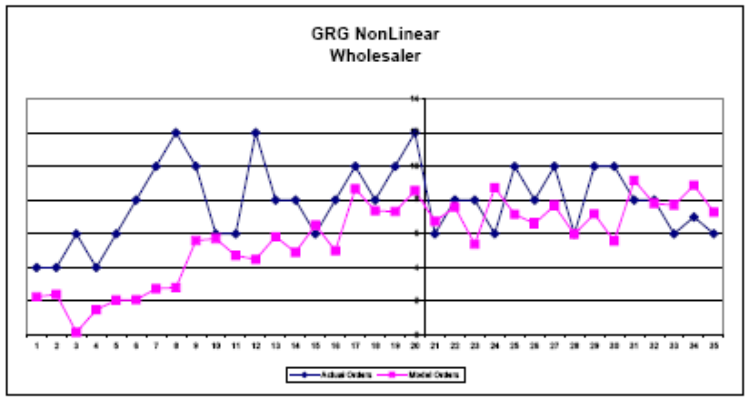


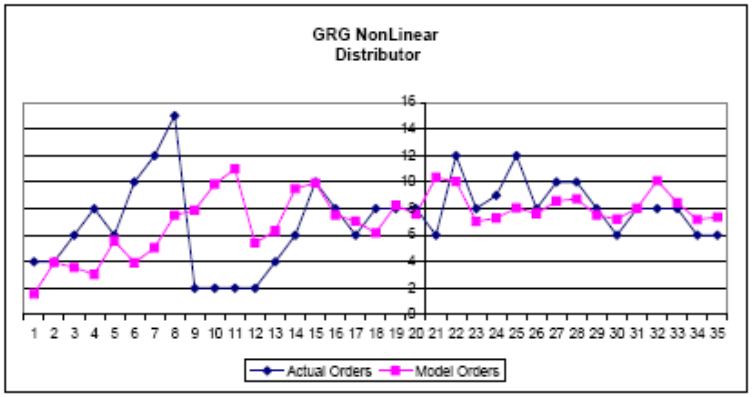


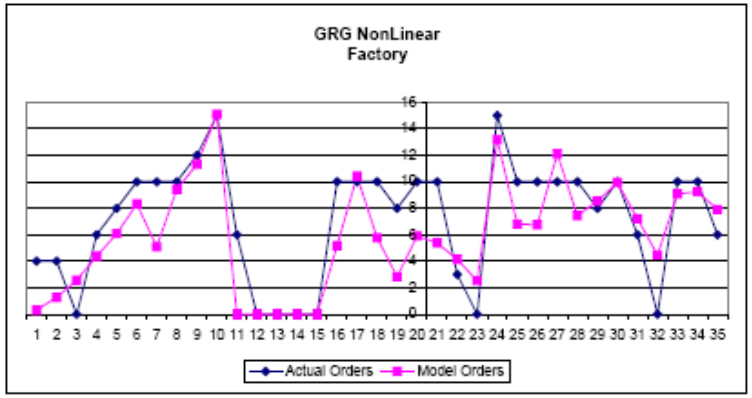


LONESTAR GAME MODEL WEEKS 21 TO 40 ORDER CHARTS









LONESTAR GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	LONESTAR	IT							LONESTAR	Retailer	IT					
	Team Costs	$ 1,055.00							Costs	$ 212.00						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	6	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	4	6	14		16	4
5	8	16	4	6	0	8	8	8	*8*	28	4	4	14		16	4
6	8	12	6	4	0	8	4	4	*6*	30	8	4	14		14	6
7	8	10	4	4	0	8	2	2	*2*	31	6	8	16		16	4
8	8	6	4	8	2	6	0	-2	*-2*	33	6	6	18		16	6
9	8	4	8	6	6	4	0	-6	*-6*	39	8	6	20		14	8
10	8	8	6	6	6	8	0	-6	*-6*	45	10	8	20		16	10
11	8	6	6	8	8	6	0	-8	*-8*	53	8	10	24		20	12
12	8	6	8	10	10	6	0	-10	*-10*	63	10	8	26		24	10
13	8	8	10	8	10	8	0	-10	*-10*	73	10	10	28		24	6
14	8	10	8	10	8	10	0	-8	*-8*	81	10	10	28		22	6
15	8	8	10	10	8	8	0	-8	*-8*	89	10	10	30		18	12
16	8	10	10	10	6	10	0	-6	*-6*	95	10	10	30		20	3
17	8	10	10	10	4	10	0	-4	*-4*	99	10	10	30		13	2
18	8	10	10	5	2	10	0	-2	*-2*	101	10	10	30		5	4
19	8	10	5	4	0	10	0	0	*0*	101	6	10	30		4	6
20	8	5	4	6	3	5	0	-3	*2*	104	6	6	31		6	10
21	8	4	6	10	7	4	0	-7	*2*	111	6	6	33		10	8
22	8	6	10	8	9	6	0	-9	*0*	120	8	6	33		8	6
23	8	10	8	6	7	10	0	-7	*2*	127	8	8	31		6	8
24	8	8	6	8	7	8	0	-7	*2*	134	6	8	31		8	8
25	8	6	8	8	9	6	0	-9	*0*	143	8	6	31		8	8
26	8	8	8	8	9	8	0	-9	*0*	152	6	8	31		8	6
27	8	8	8	6	9	8	0	-9	*0*	161	8	6	29		6	12
28	8	8	6	12	9	8	0	-9	*-2*	170	10	8	29		12	8
29	8	6	12	8	11	6	0	-11	*-2*	181	10	10	33		8	5
30	8	12	8	5	7	12	0	-7	*-4*	188	10	10	31		5	15
31	8	8	5	15	7	8	0	-7	*-4*	195	10	10	33		15	9
32	8	5	15	9	10	5	0	-10	*-2*	205	10	10	38		9	10
33	8	15	9	10	3	15	0	-3	*0*	208	8	10	33		10	10
34	8	9	10	10	2	9	0	-2	*2*	210	6	8	32		10	8
35	8	10	10	8	0	10	0	0	*4*	210	6	6	28		8	6
36	8	10	8	6	0	8	2	2	*6*	211	6	6	24		6	8
37	8	10	6	8	0	8	2	2	*6*	212	8	6	22		8	8
38	8	8	8	8	0	8	0	0	*4*	212	8	8	24		8	5
39	8	8	8	5	0	8	0	0	*2*	212	8	8	24		5	9
40	8	8	5	9	0	8	0	0	*0*	212	10	8	24		9	6

LONESTAR GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					LONESTAR Costs	Wholesaler $ 228.50		IT								LONESTAR Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	6	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*10*	24	4	6	14		16	4	4	0	12	12	*12*
5	6	0	10	10	*10*	29	6	4	14		16	4	6	0	10	10	*9*
6	4	0	10	10	*13*	34	8	6	16		14	6	8	0	10	10	*17*
7	6	0	12	12	*13*	40	10	8	18		16	8	6	0	10	10	*19*
8	8	0	8	8	*19*	44	12	10	24		18	6	10	0	10	10	*19*
9	10	0	8	8	*9*	48	10	12	30		16	10	10	0	6	6	*17*
10	12	0	10	10	*11*	53	6	10	32		16	10	10	0	4	4	*15*
11	10	0	12	12	*13*	59	6	6	28		14	10	9	0	4	4	*17*
12	6	0	14	14	*15*	66	12	6	22		14	9	2	0	8	8	*23*
13	6	0	16	16	*17*	74	8	12	24		17	2	2	0	11	11	*19*
14	12	0	12	12	*13*	80	8	8	26		13	2	2	0	1	1	*9*
15	3	0	8	8	*9*	84	6	8	28		3	2	4	5	0	-5	*5*
16	2	0	10	10	*11*	89	8	6	22		2	4	6	11	0	-11	*-3*
17	4	0	3	3	*9*	90.5	10	8	27		4	6	10	13	0	-13	*-2*
18	6	5	0	-5	*4*	95.5	8	10	35		6	10	8	15	0	-15	*-2*
19	10	11	0	-11	*-2*	106.5	10	8	39		10	8	6	15	0	-15	*0*
20	8	15	0	-15	*-6*	121.5	12	10	43		8	6	8	15	0	-15	*0*
21	6	11	0	-11	*-2*	132.5	6	12	45		6	8	8	19	0	-19	*-4*
22	8	9	0	-9	*0*	141.5	8	6	43		8	8	8	23	0	-23	*-8*
23	8	9	0	-9	*0*	150.5	8	8	45		8	8	6	21	0	-21	*-6*
24	8	9	0	-9	*0*	159.5	6	8	45		8	6	12	21	0	-21	*-6*
25	6	9	0	-9	*0*	168.5	10	6	43		6	12	8	23	0	-23	*-9*
26	12	7	0	-7	*2*	175.5	8	10	45		12	8	5	17	0	-17	*0*
27	8	9	0	-9	*0*	184.5	10	8	47		8	5	15	19	0	-19	*-3*
28	5	3	0	-3	*9*	187.5	6	10	45		5	15	9	22	0	-22	*-1*
29	15	3	0	-3	*8*	190.5	10	6	43		15	9	10	17	0	-17	*0*
30	9	8	0	-8	*8*	198.5	10	10	48		9	10	10	14	0	-14	*2*
31	10	3	0	-3	*9*	201.5	8	10	43		10	10	8	14	0	-14	*2*
32	10	4	0	-4	*5*	205.5	8	8	42		10	8	6	14	0	-14	*2*
33	8	4	0	-4	*5*	209.5	6	8	40		8	6	8	14	0	-14	*2*
34	6	4	0	-4	*5*	213.5	7	6	36		6	8	8	16	0	-16	*0*
35	8	4	0	-4	*5*	217.5	6	7	35		8	8	5	14	0	-14	*2*
36	8	4	0	-4	*7*	221.5	4	6	35		8	5	9	13	0	-13	*1*
37	5	2	0	-2	*7*	223.5	5	4	31		5	9	6	14	0	-14	*5*
38	9	0	0	0	*8*	223.5	8	5	28		9	6	5	9	0	-9	*7*
39	6	3	0	-3	*6*	226.5	6	8	31		6	5	5	8	0	-8	*8*
40	5	2	0	-2	*2*	228.5	8	6	28		5	5	5	11	0	-11	*5*

LONESTAR GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									LONESTAR	Factory	IT		
	$ 458.00											Costs	$ 156.50			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	6	4	12		16	4	4	0	12	12	*12*	18	0	8	
4	24	8	6	14		16	4	0	0	12	12	*10*	24	6	4	
5	29	6	8	18		16	0	6	0	10	10	*2*	29	8	6	
6	34	10	6	20		10	6	8	0	2	2	*2*	30	10	14	
7	39	12	10	24		8	8	10	0	2	2	*4*	31	10	18	
8	44	15	12	28		10	10	10	0	0	0	*4*	31	10	20	
9	47	2	15	37		10	10	10	2	0	-2	*2*	33	12	20	
10	49	2	2	29		10	10	12	7	0	-7	*0*	40	15	22	
11	51	2	2	21		10	12	15	0	1	1	*7*	40.5	6	27	
12	55	2	2	13		13	15	6	0	11	11	*23*	46	0	21	
13	60.5	4	2	6		26	6	0	0	24	24	*27*	58	0	6	
14	61	6	4	8		30	0	0	0	28	28	*25*	72	0	0	
15	66	10	6	12		28	0	0	0	24	24	*21*	84	0	0	
16	77	8	10	20		24	0	0	0	18	18	*15*	93	10	0	
17	90	6	8	24		18	0	10	0	8	8	*5*	97	10	10	
18	105	8	6	24		8	10	10	0	0	0	*7*	97	10	20	
19	120	8	8	22		10	10	10	0	4	4	*11*	99	8	20	
20	135	8	8	22		14	10	8	0	6	6	*13*	102	10	18	
21	154	6	8	24		16	8	10	0	8	8	*13*	106	10	18	
22	177	12	6	22		16	10	10	0	8	8	*15*	110	3	20	
23	198	8	12	26		18	10	3	0	12	12	*19*	116	0	13	
24	219	9	8	26		22	3	0	0	10	10	*7*	121	15	3	
25	242	12	9	29		13	0	15	0	5	5	*-1*	123.5	10	15	
26	259	8	12	29		5	15	10	4	0	-4	*5*	127.5	10	25	
27	278	10	8	29		15	10	10	1	0	-1	*4*	128.5	10	20	
28	300	10	10	34		10	10	10	0	1	1	*4*	129	10	20	
29	317	8	10	29		11	10	10	0	1	1	*4*	129.5	8	20	
30	331	6	8	28		11	10	8	0	1	1	*4*	130	10	18	
31	345	8	6	24		11	8	10	0	3	3	*4*	131.5	6	18	
32	359	8	8	22		11	10	6	0	5	5	*8*	134	0	16	
33	373	8	8	22		15	6	0	0	7	7	*6*	137.5	10	6	
34	389	6	8	24		13	0	10	0	5	5	*-2*	140	10	10	
35	403	6	6	22		5	10	10	3	0	-3	*0*	143	6	20	
36	416	5	6	20		10	10	6	0	1	1	*4*	143.5	6	16	
37	430	5	5	20		11	6	6	0	5	5	*4*	146	6	12	
38	439	5	5	16		11	6	6	0	6	6	*5*	149	6	12	
39	447	5	5	15		12	6	6	0	7	7	*6*	152.5	5	12	
40	458	5	5	15		13	6	5	0	8	8	*7*	156.5	0	11	

LONESTAR GAME MODEL WEEKS 21 TO 40 MODEL DATA

LONESTAR IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	6	12	6	12	6	12	0	12
4	4	12	4	10	8	12	6	10
5	4	8	6	10	6	9	8	2
6	8	6	8	13	10	17	10	2
7	6	2	10	13	12	19	10	4
8	6	-2	12	19	15	19	10	4
9	8	-6	10	9	2	17	12	2
10	10	-6	6	11	2	15	15	0
11	8	-8	6	13	2	17	6	7
12	10	-10	12	15	2	23	0	23
13	10	-10	8	17	4	19	0	27
14	10	-8	8	13	6	9	0	25
15	10	-8	6	9	10	5	0	21
16	10	-6	8	11	8	-3	10	15
17	10	-4	10	9	6	-2	10	5
18	10	-2	8	4	8	-2	10	7
19	6	0	10	-2	8	0	8	11
20	6	2	12	-6	8	0	10	13
21	6	2	6	-2	6	-4	10	13
22	8	0	8	0	12	-8	3	15
23	8	2	8	0	8	-6	0	19
24	6	2	6	0	9	-6	15	7
25	8	0	10	0	12	-9	10	-1
26	6	0	8	2	8	0	10	5
27	8	0	10	0	10	-3	10	4
28	10	-2	6	9	10	-1	10	4
29	10	-2	10	8	8	0	8	4
30	10	-4	10	8	6	2	10	4
31	10	-4	8	9	8	2	6	4
32	10	-2	8	5	8	2	0	8
33	8	0	6	5	8	2	10	6
34	6	2	7	5	6	0	10	-2
35	6	4	6	5	6	2	6	0
36	6	6	4	7	5	1	6	4
37	8	6	5	7	5	5	6	4
38	8	4	8	8	5	7	6	5
39	8	2	6	6	5	8	5	6
40	10	0	8	2	5	5	0	7

LONESTAR2 GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-anoe	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	-0.287419	0	4	16	12	12	12
2	4	4.00	4	-1.049991	3.15839	0.8416099	0.70830725	12	12	12
3	4	4.00	4	-0.615332	3.593049	0.4069506	0.16560881	12	12	12
4	4	4.00	4	1.127371	5.335752	-1.335752	1.7842338	12	12	12
5	8	4.00	12	0.179995	7.409823	4.5903775	21.0715856	8	8	12
6	8	8.00	8	0.221861	12.77466	-4.774664	22.7974139	4	4	20
7	8	8.00	10	-0.798511	13.9265	-3.926502	15.4174205	0	0	24
8	8	8.00	12	-0.287419	13.16404	-1.16404	1.35499021	-4	0	30
9	8	8.00	8	-1.049991	12.40147	-4.401469	19.3729289	0	0	30
10	8	8.00	16	-0.615332	12.83613	3.1638718	10.0100845	0	0	30
11	8	8.00	14	1.127371	12.03172	1.9682753	3.87410768	-4	0	42
12	8	8.00	10	0.179995	10.65983	-0.659831	0.43537723	0	0	44
13	8	8.00	8	0.221861	10.27718	-2.27718	5.1855466	0	0	46
14	8	8.00	4	-0.798511	8.170702	-4.170702	17.3947558	2	2	44
15	8	8.00	4	-0.287419	7.358618	-3.358618	11.2803158	6	6	36
16	8	8.00	4	-1.049991	5.272871	-1.272871	1.62020156	10	10	28
17	8	8.00	0	-0.615332	6.556566	-6.556566	42.9886592	10	10	24
18	8	8.00	0	1.127371	5.662918	-5.662918	31.9554866	18	18	8
19	8	8.00	0	0.179995	8.575824	-8.575824	73.5447609	14	14	4
20	8	8.00	2	0.221861	12.48797	-10.48797	109.997552	10	10	0
21	8	8.00	14	-0.004975	17.87911	-3.87911	15.0474941	2	2	2
22	8	8.00	28	-0.902527	15.52056	12.479443	155.736501	-6	0	16
23	8	8.00	20	-0.00085	10.47899	9.5210145	90.6497176	-14	0	44
24	8	8.00	8	0.738579	7.397755	0.6022446	0.36269857	-20	0	62
25	8	8.00	8	-0.651303	7.281426	0.7185737	0.51634817	-14	0	56
26	8	8.00	8	-1.549438	6.0966	1.9034003	3.62293286	6	6	36
27	8	8.00	8	0.207823	10.89992	-2.899918	8.40952343	-1	0	43
28	8	8.00	10	-0.004975	8.989049	1.0109511	1.02202217	-9	0	51
29	8	8.00	4	-0.902527	5.968908	-1.968908	3.87659941	-17	0	61
30	8	8.00	0	-0.00085	10.26673	-10.26673	105.405675	-5	0	45
31	8	8.00	4	0.738579	9.964153	-5.964153	35.5711151	7	7	25
32	8	8.00	4	-0.651303	2.906874	1.0933263	1.19536248	19	19	9
33	8	8.00	8	-1.549438	4.486732	3.5132676	12.3430489	16	16	8
34	8	8.00	8	0.207823	10.58841	-2.588415	6.69999127	8	8	16
35	8	8.00	8	-0.004975	12.54783	-4.547827	20.6827343	4	4	20
36	9	8.00	8	-0.902527	13.18571	-5.185709	26.8915821	-3	0	27
37	10	9.00	16	-0.00085	13.38932	2.6106848	6.81567506	-11	0	35
38	11	10.00	16	0.738579	11.7326	4.2673972	18.2106784	-19	0	51
39	12	11.00	8	-0.651303	7.946579	0.0534212	0.00285382	-27	0	67
40	13	12.00	8	-1.549438	9.472962	-0.472962	0.22369295	-25	0	65
	mean of the disturbance			-0.205655		-1.283333	mean of the standard errors			
	std dev of the disturbance			0.707114						

			constraints	
Σ (AO-Ot)2	513.2861			
θ	1.00		>=0	<=1
αs	0.76		>=0	<=1
β	0.28		>=0	<=1
S'	15.65		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

LONESTAR2 GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	2.090118	4	0.573637	0	4	16	12	12	12
2	4	3.088088	4	-0.436404	0	4	16	12	12	12
3	4	3.564589	4	-1.328489	0	4	16	12	12	12
4	4	3.792104	4	-1.44E-05	0	4	16	12	12	12
5	4	3.900736	4	-1.444998	0	4	16	12	12	12
6	12	3.952604	12	2.196541	0	12	144	12	12	12
7	8	8.157607	8	0.204155	2.698615	5.3013852	28.1046847	4	4	20
8	10	8.075252	10	-2.34916	3.674834	6.325166	40.0077248	0	0	24
9	12	9.08099	12	-0.629557	5.818006	6.1819941	38.2170508	-6	0	30
10	8	10.60626	12	-2.821371	5.151461	6.8485386	46.9024813	-6	0	30
11	16	9.244412	8	0.079487	6.30236	1.6976405	2.8819831	-6	0	34
12	14	12.77441	16	-1.45562	8.491304	7.5086961	56.3805165	-12	0	32
13	10	13.41482	20	0.878267	11.07749	8.9225122	79.6112231	-14	0	36
14	8	11.63047	20	1.09523	8.733885	11.266115	126.925343	-12	0	44
15	4	9.733444	8	0.827354	5.404644	2.5953565	6.73587534	-12	0	56
16	4	6.73755	1	0.957414	3.315033	-2.315033	5.35937913	0	0	48
17	4	5.307099	4	-0.340653	0	4	16	16	16	29
18	0	4.624101	0	0.109982	0	0	0	32	32	13
19	0	2.207872	0	-0.74253	0	0	0	40	40	5
20	0	1.054193	0	-1.350071	0	0	0	41	41	4
21	2	0.503346	0	-1.662393	0	0	0	45	45	0
22	14	1.285392	0	-2.62133	0	0	0	43	43	0
23	28	7.929151	0	0.463229	0	0	0	29	29	0
24	20	18.41676	20	0.207879	17.90205	2.0979452	4.40137399	1	1	0
25	8	19.24405	20	-0.799854	16.78105	3.21895	10.3616389	-19	0	20
26	8	13.3687	20	0.463973	10.22897	9.7710322	95.4730693	-27	0	40
27	8	10.5634	10	-0.124214	4.894917	5.1050835	26.0618773	-35	0	60
28	8	9.223946	0	0.137786	4.787746	-4.787746	22.9225125	-23	0	50
29	10	8.584398	0	-2.20122	3.749751	-3.749751	14.0606339	-11	0	30
30	4	9.324092	0	1.760555	10.39178	-10.39178	107.98909	-1	0	10
31	0	6.542096	0	-0.123861	1.695648	-1.695648	2.87522089	5	5	0
32	4	3.123658	0	-0.898518	0	0	0	5	5	0
33	4	3.581572	0	-0.930391	1.928594	-1.928594	3.71947525	1	1	0
34	8	3.800213	10	-0.362139	3.725487	6.2745127	39.3695102	-3	0	0
35	8	5.994726	10	-0.96304	4.338819	5.6611814	32.0489752	-11	0	10
36	8	7.042541	0	0.231945	5.611339	-5.611339	31.4871307	-19	0	20
37	8	7.542842	20	0.639809	6.518503	13.481497	181.750756	-27	0	20
38	16	7.78172	0	-0.314034	4.834259	-4.834259	23.3700634	-25	0	30
39	16	12.07601	10	-0.051108	10.36176	-0.36176	0.13087018	-31	0	20
40	8	14.12641	0	0.756335	12.24932	-12.24932	150.04587	-47	0	30
		mean of the disturbance		-0.386295		2.8545016	mean of the standard errors			
		std dev of the disturbance		1.175744						

Σ (AO-Ot)2	746.0681		constraints		
θ	0.52		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.10		>=0	<=1	
S'	0.28		>=0	<=100	

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0,eIO+\alpha s(s'-S_t-\beta SL_t)+\varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

LONESTAR2 GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0	4	-0.876611	30.46232	-26.46232	700.254458	12	12	12
2	4	0	4	-0.819959	30.51897	-26.51897	703.255905	12	12	12
3	4	0	100	-1.382621	29.95631	70.043689	4906.11839	12	12	12
4	4	0	0	0.050247	31.38918	-31.38918	985.280554	12	12	108
5	4	0	0	-0.047299	31.29163	-31.29163	979.166289	12	12	104
6	4	0	100	0.039449	31.37838	68.621619	4708.92656	12	12	100
7	12	0	0	-0.650779	22.1961	-22.1961	492.666657	24	24	184
8	8	0	0	0.023013	27.11592	-27.11592	735.27293	18	18	178
9	10	0	50	-0.547478	27.96077	22.039231	485.727724	16	16	172
10	12	0	0	-0.560589	0	0	0	126	126	102
11	12	0	0	-0.506593	0	0	0	114	114	102
12	8	0	20	1.654286	0	20	400	154	154	50
13	16	0	10	1.916408	0	10	100	196	196	20
14	20	0	20	-0.999245	0	20	400	180	180	30
15	20	0	10	0.210479	0	10	100	160	160	50
16	8	0	10	-0.40151	0	10	100	143	143	57
17	1	0	0	-0.946621	0	0	0	135	135	67
18	4	0	0	0.330954	0	0	0	134	134	67
19	0	0	0	1.229919	0	0	0	130	130	67
20	0	0	10	-0.911569	0	10	100	130	130	67
21	0	0	1	-0.800314	0	1	1	140	140	67
22	0	0	10	-1.146101	0	10	100	150	150	58
23	0	0	0	0.716901	0	0	0	151	151	67
24	0	0	0	1.293167	0	0	0	152	152	66
25	20	0	0	1.478091	0	0	0	153	153	65
26	20	0	0	-0.1762	0	0	0	134	134	64
27	20	0	0	0.317447	0	0	0	114	114	64
28	10	0	0	-0.800314	0	0	0	94	94	64
29	0	0	0	-1.146101	0	0	0	84	84	64
30	0	0	0	0.62206	0	0	0	84	84	64
31	0	0	0	-1.226382	0	0	0	84	84	64
32	0	0	0	0.265502	0	0	0	84	84	64
33	0	0	0	-1.652393	0	0	0	84	84	64
34	0	0	0	-2.52133	0	0	0	84	84	64
35	10	0	0	0.053082	0	0	0	84	84	64
36	10	0	0	0.671951	0	0	0	74	74	64
37	0	0	0	0.753601	0	0	0	64	64	64
38	20	0	0	-1.226382	0	0	0	64	64	64
39	0	0	6	0.265502	8.958948	-2.958948	8.75537167	44	44	64
40	10	0	10	-1.652393	7.041052	2.9589477	8.75537177	44	44	70
	mean of the disturbance			-0.226257		2.478012	mean of the standard errors			
	std dev of the disturbance			0.989458						

Σ (AO-Ot)2	118.5107		constraints		
θ	0.00		>=0	<=1	
αs	0.71		>=0	<=1	
β	0.00		>=0	<=1	
S'	56.28		>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

LONESTAR2 GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

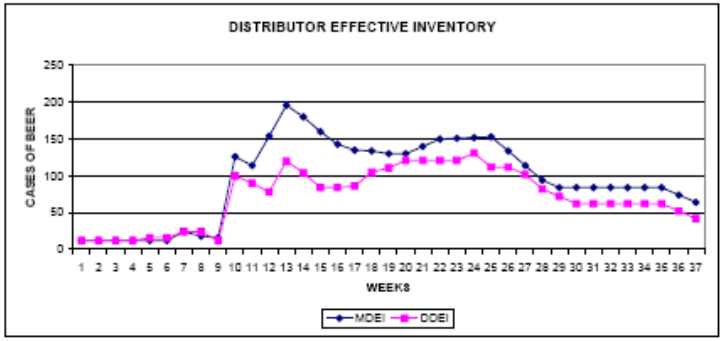
FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0	4	0.090201	0.090201	3.9097991	15.2865294	12	12	8
2	4	0	4	0.356413	0.356413	3.6435872	13.2757279	12	12	8
3	4	0	8	0.227074	0.227074	5.7729265	33.3266799	12	12	8
4	100	0	6	-0.398145	0	6	36	12	12	10
5	0	0	120	-0.884181	0	120	14400	-84	0	12
6	0	0	0	-0.20025	0	0	0	-78	0	126
7	100	0	100	1.273276	1.273276	98.726724	9746.96597	-72	0	120
8	0	0	5	0.090201	0.090201	4.9097991	24.1061276	-52	0	100
9	0	0	0	0.356413	0.356413	-0.356413	0.12703007	-52	0	105
10	50	0	0	0.227074	0.227074	-0.227074	0.05156239	48	48	5
11	0	0	0	-0.398145	0	0	0	3	3	0
12	0	0	0	-0.884181	0	0	0	3	3	0
13	20	0	0	-0.20025	0	0	0	3	3	0
14	10	0	0	1.273276	1.273276	-1.273276	1.62123259	-17	0	0
15	20	0	0	0.090201	0.090201	-0.090201	0.00813619	-27	0	0
16	10	0	10	0.356413	0.356413	9.6435872	92.9987746	-47	0	0
17	10	0	10	0.227074	0.227074	9.7729265	95.5100916	-57	0	10
18	0	0	1	0.895764	0.895764	0.1042365	0.01086524	-67	0	20
19	0	0	1	2.098904	2.098904	-1.098904	1.20758922	-57	0	11
20	0	0	1	0.859502	0.859502	0.1404985	0.01973983	-47	0	2
21	10	0	1	-0.883537	0	1	1	-46	0	2
22	1	0	0	-1.449814	0	0	0	-55	0	2
23	10	0	0	0.38665	0.38665	-0.38665	0.14949853	-55	0	1
24	0	0	0	-0.541591	0	0	0	-64	0	0
25	0	0	0	-0.908861	0	0	0	-64	0	0
26	0	0	0	-1.818839	0	0	0	-64	0	0
27	0	0	0	0.784159	0.784159	-0.784159	0.6149049	-64	0	0
28	0	0	0	-0.515879	0	0	0	-64	0	0
29	0	0	0	0.251842	0.251842	-0.251842	0.06342435	-64	0	0
30	0	0	0	1.311124	1.311124	-1.311124	1.71904504	-64	0	0
31	0	0	0	0.970371	0.970371	-0.970371	0.94162072	-64	0	0
32	0	0	0	-0.635494	0	0	0	-64	0	0
33	0	0	0	0.199379	0.199379	-0.199379	0.03975205	-64	0	0
34	0	0	0	-0.560809	0	0	0	-64	0	0
35	0	0	0	-0.467661	0	0	0	-64	0	0
36	0	0	0	-2.251814	0	0	0	-64	0	0
37	0	0	0	1.478091	1.478091	-1.478091	2.18475156	-64	0	0
38	0	0	0	-0.1762	0	0	0	-64	0	0
39	0	0	0	0.317447	0.317447	-0.317447	0.10077237	-64	0	0
40	6	0	0	-0.800314	0	0	0	-64	0	0
	mean of the disturbance			0.045076		7.3335626	mean of the standard errors			
	std dev of the disturbance			0.834556						

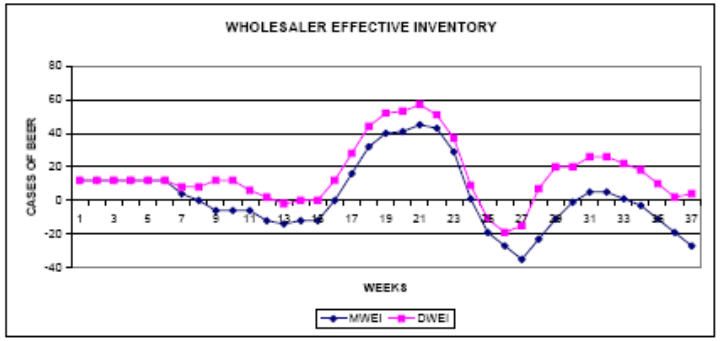
Σ (AO-Ot)2	6.81377		constraints		
θ	0.00		>=0	<=1	
αs	0.00		>=0	<=1	
β	0.01		>=0	<=1	
S'	94.91		>=0	<=100	
	GRG NonLinear				

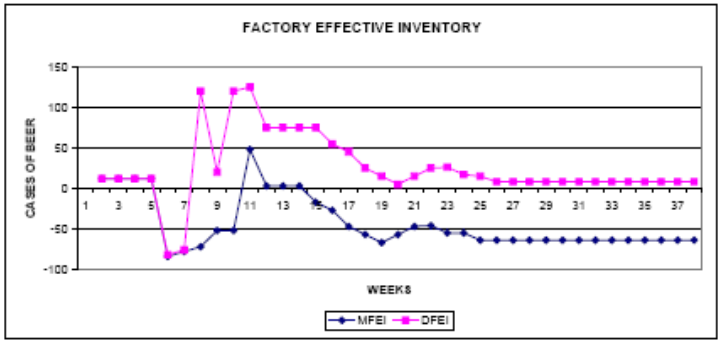
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

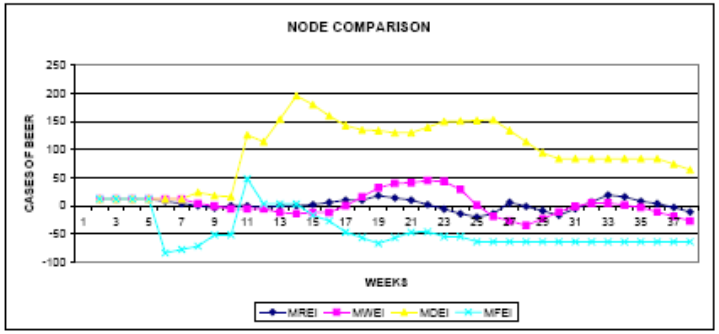
LONESTAR2 GAME MODEL WEEKS 21 TO 40

MODEL CHARTS



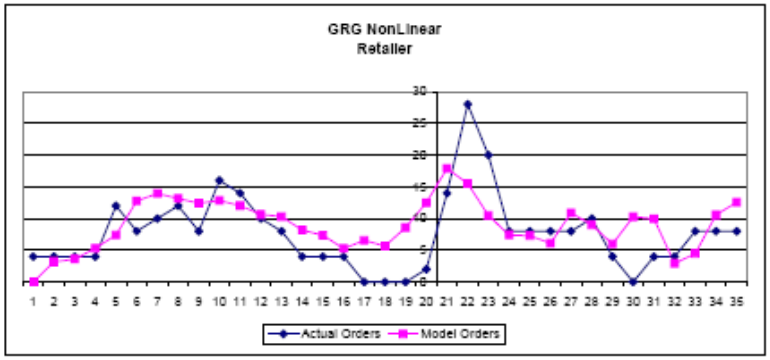


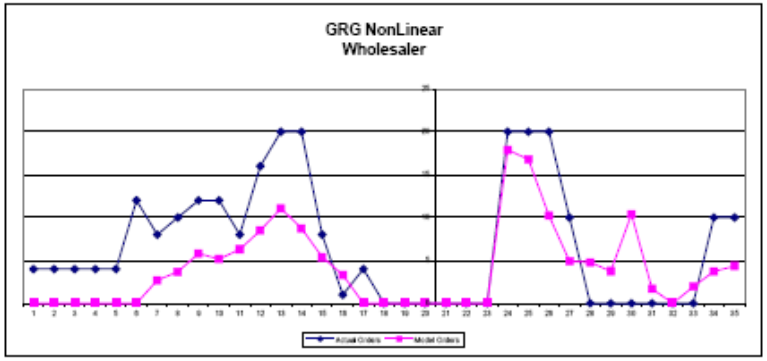


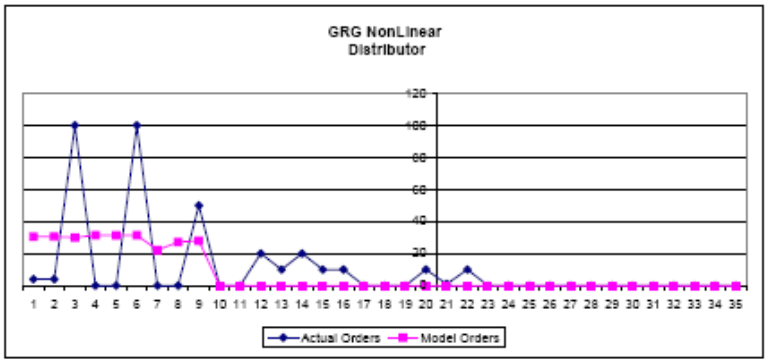


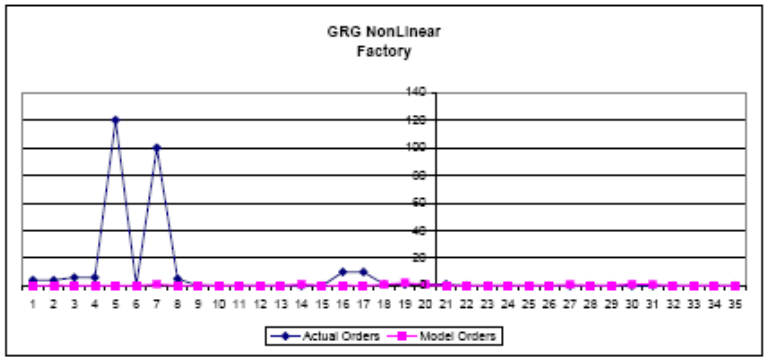
LONESTAR2 GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









LONESTAR2 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	LONESTAR 2	IT							LONESTAR 2	Retailer	IT					
	Team Costs	$ 4,591.50							Costs	$ 275.00						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	4	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	4	4	12		16	4
5	8	16	4	4	0	8	8	8	*8*	28	12	4	12		16	4
6	8	12	4	4	0	8	4	4	*4*	30	8	12	20		16	4
7	8	8	4	12	0	8	0	0	*0*	30	10	8	24		16	4
8	8	4	12	8	4	4	0	-4	*-4*	34	12	10	30		8	4
9	8	12	8	4	0	12	0	0	*0*	34	8	12	30		4	12
10	8	8	4	12	0	8	0	0	*-8*	34	16	8	30		12	8
11	8	4	12	8	4	4	0	-4	*-6*	38	14	16	42		8	10
12	8	12	8	10	0	12	0	0	*-2*	38	10	14	44		10	12
13	8	8	10	12	0	8	0	0	*-2*	38	8	10	46		12	12
14	8	10	12	12	0	8	2	2	*6*	39	4	8	44		12	8
15	8	14	12	8	0	8	6	6	*10*	42	4	4	36		8	16
16	8	18	8	16	0	8	10	10	*14*	47	4	4	28		16	20
17	8	18	16	4	0	8	10	10	*14*	52	0	4	24		20	20
18	8	26	4	4	0	8	18	18	*10*	61	0	0	8		36	8
19	8	22	4	0	0	8	14	14	*6*	68	0	0	4		40	1
20	8	18	0	0	0	8	10	10	*2*	73	2	0	0		41	4
21	8	10	0	0	0	8	2	2	*-6*	74	14	2	2		45	0
22	8	2	0	2	6	2	0	-6	*-14*	80	28	14	16		45	0
23	8	0	2	14	14	0	0	-14	*-22*	94	20	28	44		43	0
24	8	2	14	28	20	2	0	-20	*-24*	114	8	20	62		29	0
25	8	14	28	1	14	14	0	-14	*-18*	128	8	8	56		1	0
26	8	28	1	0	0	22	6	6	*2*	131	8	8	36		0	0
27	8	7	0	0	1	7	0	-1	*3*	132	8	8	43		0	20
28	8	0	0	20	9	0	0	-9	*-5*	141	10	8	51		20	20
29	8	0	20	20	17	0	0	-17	*8*	158	4	10	61		20	20
30	8	20	20	20	5	20	0	-5	*14*	163	0	4	45		20	10
31	8	20	20	5	0	13	7	7	*12*	166.5	4	0	25		10	0
32	8	27	5	0	0	8	19	19	*14*	176	4	4	9		5	0
33	8	24	0	4	0	8	16	16	*10*	184	8	4	8		5	0
34	8	16	4	1	0	8	8	8	*2*	188	8	8	16		1	0
35	8	12	1	0	0	8	4	4	*-2*	190	8	8	20		0	0
36	8	5	0	0	3	5	0	-3	*-8*	193	8	8	27		0	0
37	8	0	0	0	11	0	0	-11	*-8*	204	16	8	35		0	10
38	8	0	0	10	19	0	0	-19	*-8*	223	16	16	51		10	10
39	8	0	10	10	27	0	0	-27	*-8*	250	8	16	67		10	0
40	8	10	10	0	25	10	0	-25	*-8*	275	8	8	65		0	20

LONESTAR2 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

LONESTAR 2 Wholesaler IT LONESTAR 2
Costs $ 514.00 Costs

WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL	DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4		12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12	16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12	16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	4	4	12	16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	4	4	12	16	4	4	0	12	12	*12*
5	4	0	12	12	*12*	30	4	4	12	16	4	16	0	12	12	*16*
6	4	0	12	12	*12*	36	12	4	12	16	16	6	0	12	12	*16*
7	4	0	4	4	*8*	38	8	12	20	28	6	6	0	24	24	*24*
8	12	0	0	0	*8*	38	10	8	24	30	6	120	0	18	18	*24*
9	8	6	0	-6	*12*	44	12	10	30	24	120	0	0	18	16	*12*
10	10	6	0	-6	*12*	50	12	12	30	136	0	52	0	126	126	*100*
11	12	6	0	-6	*6*	56	8	12	34	126	52	50	0	114	114	*90*
12	12	12	0	-12	*2*	68	16	8	32	166	50	0	0	154	154	*78*
13	8	14	0	-14	*-2*	82	20	16	36	204	0	0	0	196	196	*120*
14	16	12	0	-12	*0*	94	20	20	44	196	0	3	0	180	180	*104*
15	20	12	0	-12	*0*	106	8	20	56	180	3	0	0	160	160	*84*
16	20	0	0	0	*12*	106	1	8	48	163	0	0	0	143	143	*84*
17	8	0	16	16	*28*	114	4	1	29	143	0	0	0	135	135	*86*
18	1	0	32	32	*44*	130	0	4	13	135	0	0	0	134	134	*105*
19	4	0	40	40	*52*	150	0	0	5	134	0	10	0	130	130	*111*
20	0	0	41	41	*53*	170.5	0	0	4	130	10	10	0	130	130	*121*
21	0	0	45	45	*57*	193	0	0	0	140	10	1	0	140	140	*121*
22	0	0	43	43	*51*	214.5	0	0	0	150	1	1	0	150	150	*121*
23	0	0	29	29	*37*	229	0	0	0	151	1	1	0	151	151	*121*
24	0	0	1	1	*9*	229.5	20	0	0	152	1	1	0	152	152	*131*
25	0	19	0	-19	*-11*	248.5	20	20	20	153	1	0	0	153	153	*112*
26	20	27	0	-27	*-19*	275.5	20	20	40	154	0	0	0	134	134	*112*
27	20	35	0	-35	*-15*	310.5	10	20	60	134	0	0	0	114	114	*102*
28	20	23	0	-23	*7*	333.5	0	10	50	114	0	0	0	94	94	*82*
29	10	11	0	-11	*20*	344.5	0	0	30	94	0	0	0	84	84	*72*
30	0	1	0	-1	*20*	345.5	0	0	10	84	0	0	0	84	84	*62*
31	0	0	5	5	*26*	348	0	0	0	84	0	0	0	84	84	*62*
32	0	0	5	5	*26*	350.5	0	0	0	84	0	0	0	84	84	*62*
33	0	0	1	1	*22*	351	0	0	0	84	0	0	0	84	84	*62*
34	0	3	0	-3	*18*	354	10	0	0	84	0	0	0	84	84	*62*
35	0	11	0	-11	*10*	365	10	10	10	84	0	0	0	84	84	*62*
36	10	19	0	-19	*2*	384	0	10	20	84	0	0	0	74	74	*52*
37	10	27	0	-27	*4*	411	20	0	20	74	0	0	0	64	64	*42*
38	0	25	0	-25	*6*	436	0	20	30	64	0	0	0	64	64	*42*
39	20	31	0	-31	*-10*	467	10	0	20	64	0	0	0	44	44	*22*
40	0	47	0	-47	*20*	514	0	10	30	44	0	0	0	44	44	*22*

LONESTAR2 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT								LONESTAR 2	Factory	IT		
	$ 1,849.00										Costs	$ 1,953.50			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL
0	0	4	4	12		12	4	4	0	12			0	4	8
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8
3	18	100	4	12		16	4	4	0	12	12	*12*	18	6	8
4	24	0	100	108		16	4	6	0	12	12	*12*	24	6	10
5	30	0	0	104		16	6	6	84	0	-84	*-82*	108	120	12
6	36	100	0	100		6	6	120	78	0	-78	*-76*	186	0	126
7	48	0	100	184		6	120	0	72	0	-72	*120*	258	100	120
8	57	0	0	178		120	0	100	52	0	-52	*20*	310	5	100
9	65	50	0	172		0	100	5	52	0	-52	*120*	362	0	105
10	128	0	50	102		100	5	0	0	48	48	*125*	386	0	5
11	185	0	0	102		53	0	0	0	3	3	*75*	387.5	0	0
12	262	20	0	50		3	0	0	0	3	3	*75*	389	0	0
13	360	10	20	20		3	0	0	0	3	3	*75*	390.5	0	0
14	450	20	10	30		3	0	0	17	0	-17	*75*	407.5	0	0
15	530	10	20	50		0	0	0	27	0	-27	*55*	434.5	0	0
16	601.5	10	10	57		0	0	0	47	0	-47	*45*	481.5	10	0
17	669	0	10	67		0	0	10	57	0	-57	*25*	538.5	10	10
18	736	0	0	67		0	10	10	67	0	-67	*15*	605.5	1	20
19	801	0	0	67		10	10	1	57	0	-57	*5*	662.5	1	11
20	866	10	0	67		10	1	1	47	0	-47	*15*	709.5	1	2
21	936	1	10	67		1	1	1	46	0	-46	*25*	755.5	1	2
22	1011	10	1	58		1	1	1	55	0	-55	*26*	810.5	0	2
23	1086.5	0	10	67		1	1	0	55	0	-55	*17*	865.5	0	1
24	1162.5	0	0	68		1	0	0	64	0	-64	*15*	929.5	0	0
25	1239	0	0	65		0	0	0	64	0	-64	*8*	993.5	0	0
26	1306	0	0	64		0	0	0	64	0	-64	*8*	1057.5	0	0
27	1363	0	0	64		0	0	0	64	0	-64	*8*	1121.5	0	0
28	1410	0	0	64		0	0	0	64	0	-64	*8*	1185.5	0	0
29	1452	0	0	64		0	0	0	64	0	-64	*8*	1249.5	0	0
30	1494	0	0	64		0	0	0	64	0	-64	*8*	1313.5	0	0
31	1536	0	0	64		0	0	0	64	0	-64	*8*	1377.5	0	0
32	1578	0	0	64		0	0	0	64	0	-64	*8*	1441.5	0	0
33	1620	0	0	64		0	0	0	64	0	-64	*8*	1505.5	0	0
34	1662	0	0	64		0	0	0	64	0	-64	*8*	1569.5	0	0
35	1704	0	0	64		0	0	0	64	0	-64	*8*	1633.5	0	0
36	1741	0	0	64		0	0	0	64	0	-64	*8*	1697.5	0	0
37	1773	0	0	64		0	0	0	64	0	-64	*8*	1761.5	0	0
38	1805	0	0	64		0	0	0	64	0	-64	*8*	1825.5	0	0
39	1827	6	0	64		0	0	0	64	0	-64	*8*	1889.5	0	0
40	1849	10	6	70		0	0	0	64	0	-64	*2*	1953.5	0	0

LONESTAR2 GAME MODEL WEEKS 21 TO 40 MODEL DATA

LONESTAR 2								
IT								
Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	4	12	4	12	100	12	6	12
4	4	12	4	12	0	12	6	12
5	12	8	4	12	0	16	120	-82
6	8	4	12	12	100	16	0	-76
7	10	0	8	8	0	24	100	120
8	12	-4	10	8	0	24	5	20
9	8	0	12	12	50	12	0	120
10	16	-8	12	12	0	100	0	125
11	14	-6	8	6	0	90	0	75
12	10	-2	16	2	20	78	0	75
13	8	-2	20	-2	10	120	0	75
14	4	6	20	0	20	104	0	75
15	4	10	8	0	10	84	0	55
16	4	14	1	12	10	84	10	45
17	0	14	4	28	0	86	10	25
18	0	10	0	44	0	105	1	15
19	0	6	0	52	0	111	1	5
20	2	2	0	53	10	121	1	15
21	14	-6	0	57	1	121	1	25
22	28	-14	0	51	10	121	0	26
23	20	-22	0	37	0	121	0	17
24	8	-24	20	9	0	131	0	15
25	8	-18	20	-11	0	112	0	8
26	8	2	20	-19	0	112	0	8
27	8	3	10	-15	0	102	0	8
28	10	-5	0	7	0	82	0	8
29	4	8	0	20	0	72	0	8
30	0	14	0	20	0	62	0	8
31	4	12	0	26	0	62	0	8
32	4	14	0	26	0	62	0	8
33	8	10	0	22	0	62	0	8
34	8	2	10	18	0	62	0	8
35	8	-2	10	10	0	62	0	8
36	8	-8	0	2	0	52	0	8
37	16	-8	20	4	0	42	0	8
38	16	-8	0	6	0	42	0	8
39	8	-8	10	-10	6	22	0	8
40	8	-8	0	20	10	22	0	2

MILLER GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.405192	11.77637	-7.776374	60.471991	12	12	12
2	4	0.00	4	1.295141	12.66632	-8.666323	75.1051585	12	12	12
3	4	0.00	9	0.753841	12.12502	-3.125023	9.76576853	12	12	12
4	4	0.00	9	-0.552657	10.81853	-1.818525	3.3070334	12	12	17
5	8	0.00	9	-0.300682	11.59608	-2.59608	6.73962914	8	8	22
6	8	0.00	9	0.004532	12.42687	-3.426872	11.7434544	4	4	27
7	8	0.00	9	1.409107	13.70005	-4.700052	22.0904913	5	5	27
8	8	0.00	9	-1.081508	11.07804	-2.078043	4.31826422	6	6	27
9	8	0.00	9	1.128797	13.28835	-4.288348	18.3899278	6	6	28
10	8	0.00	9	1.972937	14.39528	-5.395277	29.1090168	4	4	31
11	8	0.00	9	0.595888	13.41241	-4.412413	19.4693891	1	1	35
12	8	0.00	9	-0.236278	12.31746	-3.317457	11.0055238	3	3	34
13	8	0.00	9	0.520143	12.94248	-3.942484	15.5431797	4	4	34
14	8	0.00	9	-1.717948	11.22997	-2.229972	4.97277524	0	0	39
15	8	0.00	9	0.303488	13.25139	-4.251388	18.0743013	0	0	40
16	8	0.00	12	0.253556	13.20148	-1.201476	1.44354341	-3	0	44
17	8	0.00	12	0.205856	13.15378	-1.153776	1.33119985	-8	0	53
18	8	0.00	12	-0.416884	12.53106	-0.531056	0.28202005	-1	0	50
19	8	0.00	12	-0.091203	12.33114	-0.331137	0.10965185	4	4	49
20	8	0.00	12	0.405192	11.25079	0.7492054	0.56130878	16	16	41
21	8	0.00	12	-0.034141	11.20565	0.7943537	0.63099778	13	13	48
22	8	0.00	10	-1.017532	8.119937	1.8800626	3.5346354	29	29	36
23	8	0.00	10	-1.186828	7.425063	2.5749372	6.63030183	33	33	34
24	8	0.00	10	-0.355405	7.730906	2.2690942	5.14878838	37	37	32
25	8	0.00	10	-0.860796	6.699936	3.3000643	10.8904245	41	41	30
26	8	0.00	10	0.784937	9.082879	1.9171211	3.67535343	43	43	30
27	8	0.00	6	-0.665365	6.369788	-0.369788	0.13674284	45	45	30
28	8	0.00	6	-0.034141	6.738222	-0.738222	0.54497172	47	47	26
29	8	0.00	6	-1.017532	5.492041	0.5079593	0.25802261	49	49	22
30	8	0.00	6	-1.186828	5.059956	0.9400442	0.88368317	51	51	18
31	8	0.00	6	-0.355405	6.154168	-0.154168	0.02376772	49	49	18
32	8	0.00	6	-0.860796	5.911567	0.0884333	0.00782045	47	47	18
33	8	0.00	6	0.784937	7.820089	-1.820089	3.31272471	45	45	18
34	8	0.00	6	-0.665365	6.632577	-0.632577	0.40015394	43	43	18
35	8	0.00	6	-0.034141	7.526591	-1.526591	2.33048006	41	41	18
36	9	0.00	6	-1.017532	6.805989	-0.805989	0.64961837	39	39	18
37	10	0.00	6	-1.186828	6.899483	-0.899483	0.80907043	37	37	18
38	11	0.00	6	-0.355405	7.993895	-1.993895	3.97482171	35	35	18
39	12	0.00	6	-0.860796	7.751094	-1.751094	3.06633142	33	33	18
40	13	0.00	6	0.784937	9.659617	-3.659617	13.3927956	31	31	18
	mean of the disturbance			-0.052797		-1.584635	mean of the standard errors			
	std dev of the disturbance			0.839318						

			constraints	
Σ (AO-Ot)2	60.30151			
θ	0.00		>=0	<=1
αs	0.13		>=0	<=1
β	0.00		>=0	<=1
S'	98.54		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

MILLER GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	1.680746	4	-1.195834	10.71753	-6.717529	45.1251912	12	12	12
2	4	2.655265	4	1.751217	14.6391	-10.6391	113.190416	12	12	12
3	4	3.220305	6	1.884539	15.33746	-9.33746	87.1881562	12	12	12
4	9	3.547922	6	1.286314	14.36346	-8.363456	69.9474025	12	12	14
5	9	5.838812	5	-0.502184	16.58223	-11.58223	134.147995	7	7	16
6	9	7.167101	10	1.714783	22.19556	-12.19556	148.731691	2	2	17
7	9	7.93726	15	-0.361461	20.45059	-5.450593	29.7089666	-1	0	21
8	9	8.383809	12	-1.484449	16.60887	-4.608873	21.2417125	-4	0	30
9	9	8.642724	20	0.508238	16.39859	3.6014109	12.9701599	-8	0	37
10	9	8.792847	18	-0.158988	12.36451	5.6354947	31.758801	-7	0	47
11	9	8.87989	20	-0.609245	8.83601	11.16399	124.634684	-7	0	56
12	9	8.930358	20	-0.062332	3.806224	16.193776	262.238387	-12	0	72
13	9	8.959821	20	0.813084	0.490526	19.509474	380.619566	-13	0	84
14	9	8.976588	20	-1.30608	0	20	400	-17	0	99
15	9	8.986425	10	-0.139543	0	10	100	-23	0	116
16	9	8.992129	10	0.076132	0	10	100	-17	0	111
17	12	8.995436	10	-0.255195	0	10	100	-13	0	108
18	12	10.25791	12	0.058846	0	12	144	-5	0	98
19	12	10.99991	5	-0.861707	0	5	25	-12	0	105
20	12	11.41434	1	-0.570906	0.064316	0.9356838	0.87550413	6	6	80
21	12	11.66043	1	1.310986	3.680327	-2.680327	7.18415176	24	24	51
22	12	11.80311	5	1.516078	3.532319	1.4676814	2.15408878	57	57	7
23	10	11.88584	5	0.888459	6.375115	-1.375115	1.89094107	50	50	7
24	10	11.09344	10	0.153677	7.796731	2.2032687	4.85439291	41	41	11
25	10	10.63399	10	1.219561	9.593482	0.4065178	0.1652567	32	32	20
26	10	10.3676	15	-0.480624	8.288188	6.7118116	45.0484154	27	27	25
27	10	10.21314	10	-0.276248	7.240901	2.7590987	7.6126255	22	22	35
28	6	10.12358	7	0.737609	8.165201	-1.165201	1.35769245	22	22	35
29	6	8.390907	3	0.232154	5.046347	-2.046347	4.18753663	26	26	32
30	6	7.39828	3	-1.574639	2.099708	0.9002919	0.81052553	35	35	20
31	6	6.803784	3	2.594057	6.211974	-3.211974	10.3167745	39	39	13
32	6	6.466045	3	-2.285267	1.917747	1.0822526	1.1712707	40	40	9
33	6	6.270219	5	-0.214992	5.244062	-0.244062	0.05956623	37	37	9
34	6	6.156677	5	0.475357	6.569338	-1.569338	2.4628203	34	34	11
35	6	6.090843	5	-0.475442	6.301174	-1.301174	1.6930536	31	31	13
36	6	6.052872	5	-0.566823	6.920091	-1.920091	3.68874983	28	28	15
37	6	6.03054	6	0.400586	8.349323	-2.349323	5.51931639	27	27	15
38	6	6.017708	7	1.094954	9.183115	-2.183115	4.67906659	26	26	16
39	6	6.010267	10	0.401565	8.242845	1.7571554	3.08759506	25	25	18
40	6	6.005953	9	-0.301197	6.261234	2.7387657	7.50083743	24	24	23
	mean of the disturbance			0.125884		1.6309262	mean of the standard errors			
	std dev of the disturbance			1.098329						

Σ (AO-Ot)2	115.4427		constraints		
θ	0.42		>=0	<=1	
αs	0.48		>=0	<=1	
β	0.73		>=0	<=1	
S'	41.86		>=0	<=100	

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

MILLER GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	0.559856	6.056596	-2.056596	4.22958715	12	12	12
2	4	4	4	1.588044	7.084784	-3.084784	9.51588947	12	12	12
3	4	4	3	-0.193606	5.303134	-2.303134	5.30442511	12	12	12
4	6	4	5	1.225061	6.7218	-1.7218	2.96459662	12	12	11
5	6	6	8	-2.051923	6.036749	1.9632514	3.85435623	10	10	12
6	5	6	4	-0.402007	8.278596	-4.278596	18.306398	8	8	16
7	10	5	8	0.404478	8.677013	-0.677013	0.45834679	6	6	17
8	15	10	5	0.873986	15.62635	-10.62635	112.919337	1	1	20
9	12	15	3	-2.168486	17.87985	-14.87985	221.4098	-6	0	17
10	20	12	15	0.118543	17.16687	-2.166874	4.69534426	-14	0	16
11	18	20	30	-0.350076	24.69826	5.3017448	28.1084979	-26	0	23
12	20	18	20	-1.548487	21.49984	-1.499845	2.24953403	-39	0	48
13	20	20	20	-0.067026	24.98131	-4.981305	24.8133998	-56	0	65
14	20	20	50	-1.724166	23.32416	26.675835	711.600183	-61	0	70
15	20	20	30	1.884539	26.93287	3.0671299	9.40728566	-68	0	107
16	10	20	30	1.288314	26.33465	3.6653548	13.4348258	-68	0	117
17	10	10	10	-0.502184	14.54615	-4.546148	20.6674577	-73	0	142
18	10	10	20	1.714783	16.76311	3.2368855	10.4774275	-53	0	122
19	12	10	10	-0.361461	14.68687	-4.68687	21.9667477	-33	0	112
20	5	12	10	-1.195834	14.37267	-4.372668	19.1202237	5	5	72
21	1	5	3	0.637463	0	3	9	42	42	40
22	1	1	0	-0.540012	0	0	0	61	61	23
23	5	1	5	0.026199	0	5	25	70	70	13
24	5	5	0	-0.491424	0	0	0	75	75	8
25	10	5	5	1.04303	0	5	25	73	73	5
26	10	10	0	0.984741	0	0	0	63	63	10
27	15	10	5	-0.481883	0	5	25	58	58	5
28	10	15	10	-0.493124	6.828671	3.171329	10.0573275	43	43	10
29	7	10	3	1.186757	4.988382	-1.988382	3.95366124	38	38	15
30	3	7	3	0.877598	3.750985	-0.750985	0.56397787	31	31	18
31	3	3	3	-0.662717	0	3	9	33	33	16
32	3	3	0	-0.333224	0	0	0	40	40	9
33	3	3	0	-0.190076	0	0	0	40	40	6
34	5	3	0	-2.62987	0	0	0	40	40	3
35	5	5	0	-0.783558	0	0	0	38	38	0
36	5	5	0	-0.716105	0	0	0	33	33	0
37	5	5	0	-0.178885	1.582399	-1.582399	2.50398815	28	28	0
38	6	5	3	0.329068	3.570183	-0.570183	0.32510819	23	23	0
39	7	6	7	0.598781	6.615691	0.3843091	0.14769348	17	17	3
40	10	7	10	-0.425419	8.663253	1.3367469	1.78689231	10	10	10
	mean of the disturbance			-0.07885		0.0988667	mean of the standard errors			
	std dev of the disturbance			1.129772						

Σ (AO-Ot)2	112.3386		constraints	
θ	1.00		>=0	<=1
αs	0.30		>=0	<=1
β	0.00		>=0	<=1
S'	17.06		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

MILLER GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.893032	4	-1.155338	8.923751	-4.923751	24.2433228	12	12	8
2	4	1.586688	4	-0.353523	10.41922	-6.419221	41.2064029	12	12	8
3	4	2.125479	5	1.436819	12.74835	-7.748355	60.0369995	12	12	8
4	3	2.543981	4	0.753402	12.29922	-8.299222	68.8770812	12	12	9
5	5	2.645791	3	0.772199	12.23561	-9.235611	85.2965069	13	13	9
6	8	3.171387	5	-2.024527	10.33292	-5.332916	28.4399979	13	13	7
7	4	4.249413	10	0.698566	14.68669	-4.68669	21.9650644	9	9	8
8	8	4.19373	5	-0.265525	12.56161	-7.561608	57.1779178	8	8	15
9	5	5.04351	10	2.265274	16.49484	-6.494841	42.1829564	5	5	15
10	3	5.033796	6	0.724331	14.02309	-8.023094	64.3700346	10	10	15
11	15	4.579735	20	-0.234622	12.05743	7.9425742	63.0844857	12	12	16
12	30	6.906143	5	-0.562836	13.13453	-8.134531	66.17059	7	7	26
13	20	12.06203	30	1.026006	21.353	8.6469953	74.7705282	-17	0	25
14	20	13.83425	30	-1.235854	19.02118	10.978819	120.534486	-17	0	35
15	50	15.2108	50	-1.159612	15.86853	34.131471	1164.9573	-32	0	60
16	30	22.97777	100	-1.90862	19.20213	80.79787	6528.29574	-52	0	80
17	30	24.54554	30	-1.470871	8.312396	21.687604	470.352165	-52	0	150
18	10	25.76329	30	-1.155338	13.53004	16.46996	271.259585	-32	0	130
19	20	22.24401	32	-0.353523	13.02319	18.976811	360.119363	58	58	60
20	10	21.74302	20	1.436819	12.10192	7.8980771	62.3796222	68	68	62
21	10	19.12129	5	-1.024305	5.176897	-0.176897	0.03129269	88	88	52
22	3	17.08489	5	-0.432801	4.653089	0.3469113	0.12034745	110	110	25
23	0	13.94033	2	0.552473	2.125362	-0.125362	0.01571567	127	127	10
24	5	10.82804	0	-1.293102	0	0	0	132	132	7
25	0	9.526881	0	1.576789	0	0	0	132	132	2
26	5	7.399928	0	-2.088772	0	0	0	134	134	0
27	0	6.864125	0	-1.506786	0	0	0	129	129	0
28	5	5.331654	0	0.32472	0	0	0	129	129	0
29	10	5.25761	0	-2.583383	0	0	0	124	124	0
30	3	6.316386	0	-0.216912	0	0	0	114	114	0
31	3	5.575977	0	-1.882399	0	0	0	111	111	0
32	3	5.000869	0	2.077232	0.052983	-0.052983	0.00280715	108	108	0
33	0	4.554159	0	-1.985272	0	0	0	105	105	0
34	0	3.537407	0	0.758287	0	0	0	105	105	0
35	0	2.747662	5	1.249968	0	5	25	105	105	0
36	0	2.134217	0	1.938383	0	0	0	105	105	5
37	0	1.657736	0	1.166462	0	0	0	105	105	5
38	0	1.287633	0	-0.23	0	0	0	110	110	0
39	3	1.000159	0	-0.043616	0	0	0	110	110	0
40	7	1.446639	0	1.931352	0	0	0	107	107	0
	mean of the disturbance			-0.264058		3.8760575	mean of the standard errors			
	std dev of the disturbance			1.320456						

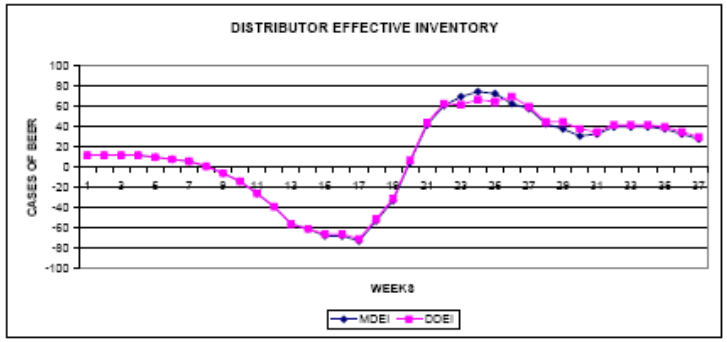
Σ (AO-Ot)2	25.17016		constraints	
θ	0.22		>=0	<=1
αs	0.18		>=0	<=1
β	1.00		>=0	<=1
S'	69.87		>=0	<=100

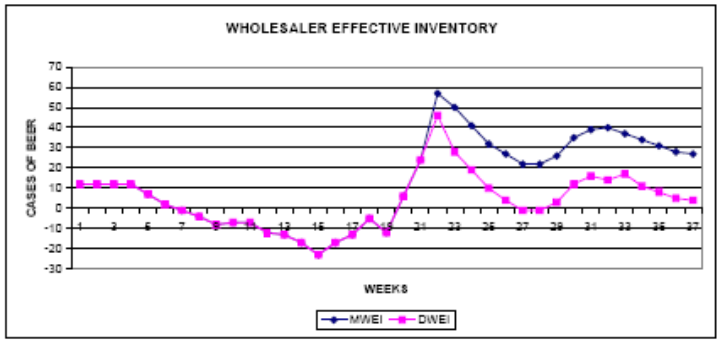
GRG NonLinear

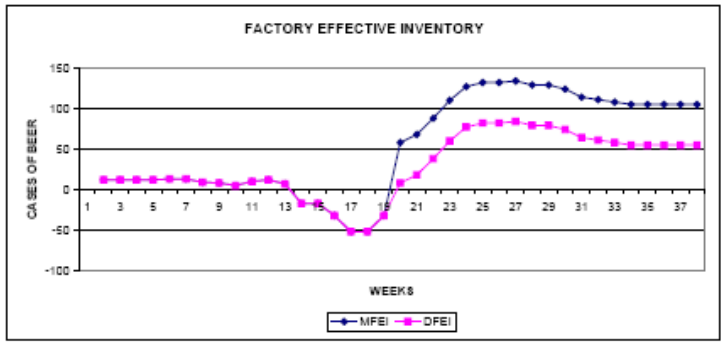
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

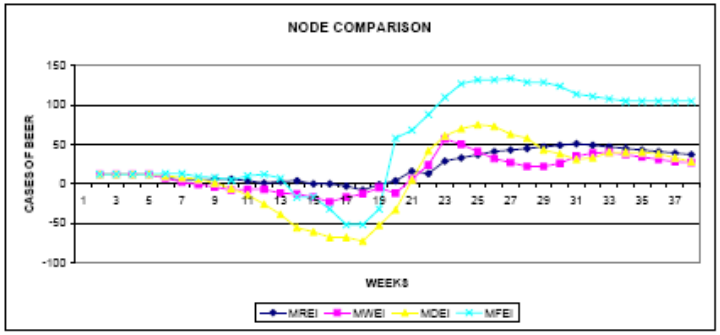
MILLER GAME MODEL WEEKS 21 TO 40

MODEL CHARTS

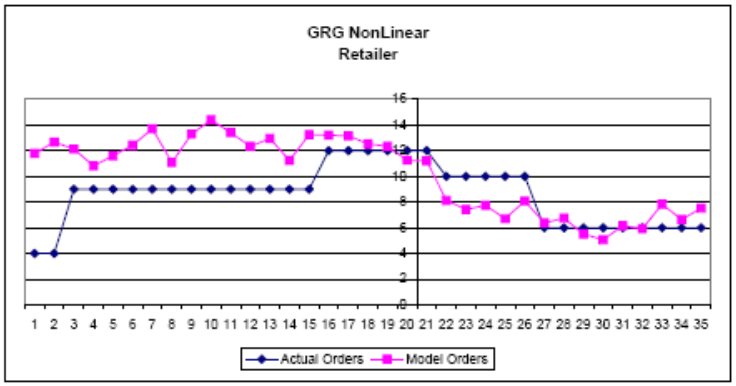


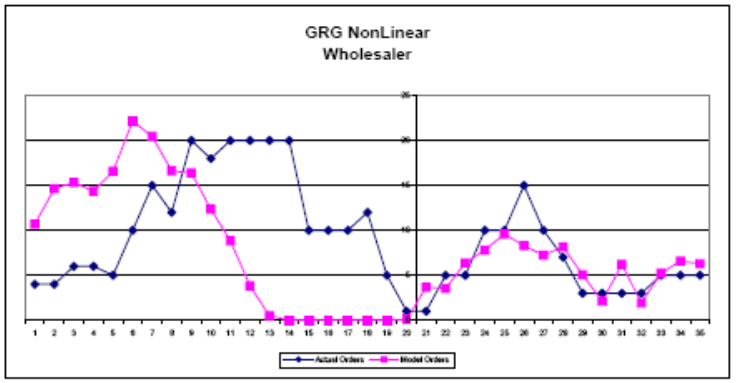


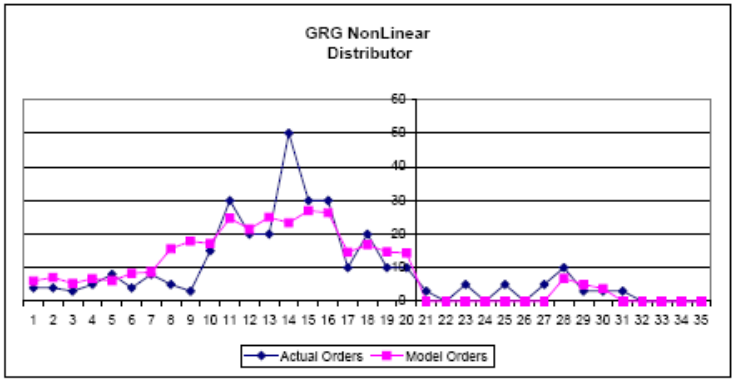


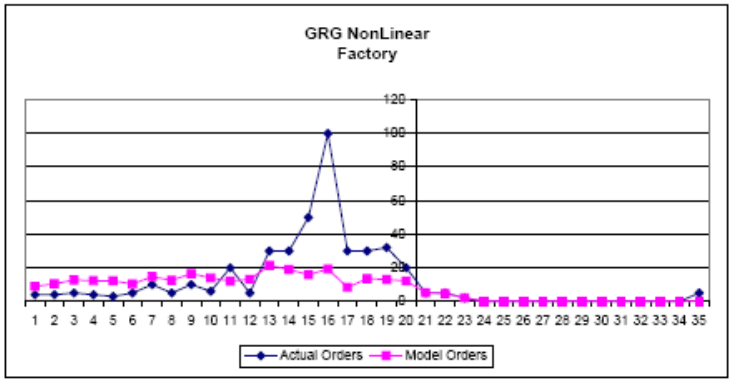


MILLER GAME MODEL WEEKS 21 TO 40 ORDER CHARTS









MILLER GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	MILLER	IT								MILLER	Retailer	IT				
	Team Costs	$ 3,391.00								Costs	$ 460.50					
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	9	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	9	9	17		16	4
5	8	16	4	9	0	8	8	8	*8*	28	9	9	22		16	4
6	8	12	9	9	0	8	4	4	*4*	30	9	9	27		11	6
7	8	13	9	8	0	8	5	5	*5*	32.5	9	9	27		8	6
8	8	14	8	6	0	8	6	6	*6*	35.5	9	9	27		6	5
9	8	14	6	5	0	8	6	6	*6*	38.5	9	9	28		5	10
10	8	12	5	10	0	8	4	4	*4*	40.5	9	9	31		10	9
11	8	9	10	9	0	8	1	1	*1*	41	9	9	35		9	4
12	8	11	9	4	0	8	3	3	*3*	42.5	9	9	34		4	8
13	8	12	4	8	0	8	4	4	*4*	44.5	9	9	34		8	5
14	8	8	8	5	0	8	0	0	*0*	44.5	9	9	39		5	3
15	8	8	5	3	0	8	0	0	*0*	44.5	9	9	40		3	15
16	8	5	3	15	3	5	0	-3	*-3*	47.5	12	9	44		15	13
17	8	3	15	13	8	3	0	-8	*-8*	55.5	12	12	53		13	20
18	8	15	13	20	1	15	0	-1	*-1*	56.5	12	12	50		20	5
19	8	13	20	5	0	9	4	4	*4*	58.5	12	12	49		5	30
20	8	24	5	24	0	8	16	16	*16*	66.5	12	12	41		30	30
21	8	21	24	12	0	8	13	13	*13*	73	12	12	48		36	45
22	8	37	12	12	0	8	29	29	*29*	87.5	10	12	36		69	5
23	8	41	12	12	0	8	33	33	*33*	104	10	10	34		62	1
24	8	45	12	10	0	8	37	37	*47*	122.5	10	10	32		51	1
25	8	49	10	10	0	8	41	41	*61*	143	10	10	30		42	5
26	8	51	10	10	0	8	43	43	*63*	164.5	10	10	30		37	5
27	8	53	10	10	0	8	45	45	*65*	187	6	10	30		32	10
28	8	55	10	10	0	8	47	47	*67*	210.5	6	6	28		32	10
29	8	57	10	6	0	8	49	49	*68*	235	6	6	22		32	15
30	8	59	6	6	0	8	51	51	*70*	260.5	6	6	18		41	10
31	8	57	6	6	0	8	49	49	*69*	285	6	6	18		45	7
32	8	55	6	6	0	8	47	47	*67*	308.5	6	6	18		46	3
33	8	53	6	6	0	8	45	45	*65*	331	6	6	18		43	3
34	8	51	6	6	0	8	43	43	*63*	352.5	6	6	18		40	3
35	8	49	6	6	0	8	41	41	*61*	373	6	6	18		37	3
36	8	47	6	6	0	8	39	39	*59*	392.5	6	6	18		34	5
37	8	45	6	6	0	8	37	37	*57*	411	6	6	18		33	5
38	8	43	6	6	0	8	35	35	*55*	428.5	6	6	18		32	5
39	8	41	6	6	0	8	33	33	*53*	445	6	6	18		31	5
40	8	39	6	6	0	8	31	31	*51*	460.5	6	6	18		30	6

MILLER GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					MILLER	Wholesaler		IT								MILLER
					Costs	$ 494.00										Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	6	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	6	6	14		16	4	4	0	12	12	*12*
5	6	0	7	7	*7*	27.5	5	6	16		16	4	3	0	10	10	*10*
6	6	0	2	2	*2*	28.5	10	5	17		14	3	5	0	8	8	*8*
7	5	1	0	-1	*-1*	29.5	15	10	21		11	5	8	0	6	6	*6*
8	10	4	0	-4	*-4*	33.5	12	15	30		11	8	4	0	1	1	*1*
9	9	8	0	-8	*-8*	41.5	20	12	37		9	4	8	6	0	-6	*-6*
10	4	7	0	-7	*-7*	48.5	18	20	47		4	8	5	14	0	-14	*-14*
11	8	7	0	-7	*-7*	55.5	20	18	56		8	5	3	26	0	-26	*-26*
12	5	12	0	-12	*-12*	67.5	20	20	72		5	3	15	39	0	-39	*-39*
13	3	13	0	-13	*-13*	80.5	20	20	84		3	15	13	56	0	-56	*-56*
14	15	17	0	-17	*-17*	97.5	20	20	99		15	13	20	61	0	-61	*-61*
15	13	23	0	-23	*-23*	120.5	10	20	116		13	20	5	68	0	-68	*-66*
16	20	17	0	-17	*-17*	137.5	10	10	111		20	5	30	68	0	-68	*-66*
17	5	13	0	-13	*-13*	150.5	10	10	108		5	30	30	73	0	-73	*-71*
18	30	5	0	-5	*-5*	155.5	12	10	98		30	30	50	53	0	-53	*-51*
19	30	12	0	-12	*-12*	167.5	5	12	105		30	50	42	33	0	-33	*-31*
20	45	0	6	6	*6*	170.5	1	5	80		50	42	20	0	5	5	*7*
21	5	0	24	24	*24*	182.5	1	1	51		47	20	10	0	42	42	*44*
22	1	0	57	57	*46*	211	5	1	7		62	10	10	0	61	61	*63*
23	1	0	50	50	*28*	236	5	5	7		71	10	3	0	70	70	*62*
24	5	0	41	41	*19*	256.5	10	5	11		80	3	0	0	75	75	*67*
25	5	0	32	32	*10*	272.5	10	10	20		78	0	5	0	73	73	*65*
26	10	0	27	27	*4*	286	15	10	25		73	5	0	0	63	63	*70*
27	10	0	22	22	*-1*	297	10	15	35		68	0	5	0	58	58	*60*
28	15	0	22	22	*-1*	308	7	10	35		58	5	0	0	43	43	*45*
29	10	0	26	26	*3*	321	3	7	32		48	0	5	0	38	38	*45*
30	7	0	35	35	*12*	338.5	3	3	20		38	5	10	0	31	31	*38*
31	3	0	39	39	*16*	358	3	3	13		36	10	3	0	33	33	*35*
32	3	0	40	40	*14*	378	3	3	9		43	3	3	0	40	40	*42*
33	3	0	37	37	*17*	396.5	5	3	9		43	3	3	0	40	40	*42*
34	3	0	34	34	*11*	413.5	5	5	11		43	3	0	0	40	40	*42*
35	5	0	31	31	*8*	429	5	5	13		43	0	0	0	38	38	*40*
36	5	0	28	28	*5*	443	5	5	15		38	0	0	0	33	33	*35*
37	5	0	27	27	*4*	456.5	6	5	15		33	0	0	0	28	28	*30*
38	5	0	26	26	*3*	469.5	7	6	16		28	0	0	0	23	23	*25*
39	6	0	25	25	*2*	482	10	7	18		23	0	0	0	17	17	*19*
40	7	0	24	24	*1*	494	9	10	23		17	0	3	0	10	10	*12*

MILLER GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									MILLER	Factory	IT		
	$ 964.00											Costs	$ 1,472.50			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	3	4	12		16	4	4	0	12	12	*12*	18	5	8	
4	24	5	3	11		16	4	5	0	12	12	*12*	24	4	9	
5	29	8	5	12		16	5	4	0	13	13	*13*	30.5	3	9	
6	33	4	8	16		18	4	3	0	13	13	*13*	37	5	7	
7	36	8	4	17		17	3	5	0	9	9	*9*	41.5	10	8	
8	36.5	5	8	20		12	5	10	0	8	8	*8*	45.5	5	15	
9	42.5	3	5	17		13	10	5	0	5	5	*5*	48	10	15	
10	56.5	15	3	16		15	5	10	0	10	10	*10*	53	6	15	
11	82.5	30	15	23		15	10	6	0	12	12	*12*	59	20	16	
12	121.5	20	30	48		22	6	20	0	7	7	*7*	62.5	5	26	
13	177.5	20	20	65		13	20	5	17	0	-17	*-17*	79.5	30	25	
14	238.5	50	20	70		20	5	30	17	0	-17	*-17*	96.5	30	35	
15	306.5	30	50	107		5	30	30	32	0	-32	*-32*	128.5	50	60	
16	374.5	30	30	117		30	30	50	52	0	-52	*-52*	180.5	100	80	
17	447.5	10	30	142		30	50	100	52	0	-52	*-52*	232.5	30	150	
18	500.5	20	10	122		50	100	30	32	0	-32	*-32*	264.5	30	130	
19	533.5	10	20	112		100	30	30	0	58	58	*8*	293.5	32	60	
20	536	10	10	72		88	30	32	0	68	68	*18*	327.5	20	62	
21	557	3	10	40		98	32	20	0	88	88	*38*	371.5	5	52	
22	587.5	0	3	23		120	20	5	0	110	110	*60*	426.5	5	25	
23	622.5	5	0	13		130	5	5	0	127	127	*77*	490	2	10	
24	660	0	5	8		132	5	2	0	132	132	*82*	556	0	7	
25	696.5	5	0	5		137	2	0	0	132	132	*82*	622	0	2	
26	728	0	5	10		134	0	0	0	134	134	*84*	689	0	0	
27	757	5	0	5		134	0	0	0	129	129	*79*	753.5	0	0	
28	778.5	10	5	10		129	0	0	0	129	129	*79*	818	0	0	
29	797.5	3	10	15		129	0	0	0	124	124	*74*	880	0	0	
30	813	3	3	18		124	0	0	0	114	114	*64*	937	0	0	
31	829.5	3	3	16		114	0	0	0	111	111	*61*	992.5	0	0	
32	849.5	0	3	9		111	0	0	0	108	108	*58*	1046.5	0	0	
33	869.5	0	0	6		108	0	0	0	105	105	*55*	1099	0	0	
34	889.5	0	0	3		105	0	0	0	105	105	*55*	1151.5	0	0	
35	908.5	0	0	0		105	0	0	0	105	105	*55*	1204	5	0	
36	925	0	0	0		105	0	5	0	105	105	*55*	1256.5	0	5	
37	939	0	0	0		105	5	0	0	105	105	*55*	1309	0	5	
38	950.5	3	0	0		110	0	0	0	110	110	*60*	1364	0	0	
39	959	7	3	3		110	0	0	0	110	110	*60*	1419	0	0	
40	964	10	7	10		110	0	0	0	107	107	*57*	1472.5	0	0	

MILLER GAME MODEL WEEKS 21 TO 40 MODEL DATA

MILLER IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	9	12	6	12	3	12	5	12
4	9	12	6	12	5	12	4	12
5	9	8	5	7	8	10	3	13
6	9	4	10	2	4	8	5	13
7	9	5	15	-1	8	6	10	9
8	9	6	12	-4	5	1	5	8
9	9	6	20	-8	3	-6	10	5
10	9	4	18	-7	15	-14	6	10
11	9	1	20	-7	30	-26	20	12
12	9	3	20	-12	20	-39	5	7
13	9	4	20	-13	20	-56	30	-17
14	9	0	20	-17	50	-61	30	-17
15	9	0	10	-23	30	-66	50	-32
16	12	-3	10	-17	30	-66	100	-52
17	12	-8	10	-13	10	-71	30	-52
18	12	-1	12	-5	20	-51	30	-32
19	12	4	5	-12	10	-31	32	8
20	12	16	1	6	10	7	20	18
21	12	13	1	24	3	44	5	38
22	10	29	5	46	0	63	5	60
23	10	33	5	28	5	62	2	77
24	10	47	10	19	0	67	0	82
25	10	61	10	10	5	65	0	82
26	10	63	15	4	0	70	0	84
27	6	65	10	-1	5	60	0	79
28	6	67	7	-1	10	45	0	79
29	6	68	3	3	3	45	0	74
30	6	70	3	12	3	38	0	64
31	6	69	3	16	3	35	0	61
32	6	67	3	14	0	42	0	58
33	6	65	5	17	0	42	0	55
34	6	63	5	11	0	42	0	55
35	6	61	5	8	0	40	5	55
36	6	59	5	5	0	35	0	55
37	6	57	6	4	0	30	0	55
38	6	55	7	3	3	25	0	60
39	6	53	10	2	7	19	0	60
40	6	51	9	1	10	12	0	57

NAPOLY GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	-0.267971	0	4	16	12	12	12
2	4	0.18	4	-1.025257	0	4	16	12	12	12
3	4	0.35	4	0.676488	0	4	16	12	12	12
4	4	0.51	7	-0.230405	0	7	49	12	12	12
5	8	0.66	7	-0.350763	0	7	49	8	8	15
6	8	0.98	10	-0.571371	0.13486	9.8651404	97.3209942	4	4	18
7	8	1.29	15	-0.320899	3.208802	11.791198	139.032353	0	0	24
8	8	1.59	5	-0.267971	3.557764	1.4422359	2.08004432	-1	0	32
9	8	1.87	8	-1.025257	3.083443	4.9165571	24.1725335	-2	0	30
10	8	2.14	6	0.676488	5.05566	0.9443404	0.89177876	0	0	28
11	8	2.40	4	-0.230405	4.407297	-0.407297	0.16589085	-4	0	30
12	8	2.65	2	-0.350763	4.534056	-2.534056	6.42144036	-4	0	26
13	8	2.89	4	-0.571371	4.549665	-0.549665	0.30212061	-4	0	20
14	8	3.11	8	-0.320899	5.025905	2.974095	8.84524116	-8	0	20
15	8	3.33	8	-0.267971	5.294644	2.7053564	7.31895349	-12	0	24
16	8	3.53	19	-1.025257	4.743641	14.256359	203.243786	-15	0	27
17	8	3.73	20	0.676488	6.642561	13.357439	178.421182	-16	0	39
18	8	3.92	2	-0.230405	5.924138	-3.924138	15.3988572	-22	0	57
19	8	4.10	8	-0.350763	5.98393	2.0160704	4.06454005	-25	0	54
20	8	4.27	8	-0.571371	5.935518	2.0644823	4.26208726	-21	0	50
21	8	4.44	4	1.754627	8.426009	-4.426009	19.5895561	-17	0	46
22	8	4.59	0	-2.027106	4.801703	-4.801703	23.0563521	0	0	25
23	8	4.74	0	-1.434188	2.402799	-2.402799	5.77344178	5	5	12
24	8	4.89	8	1.593117	5.573845	2.4261552	5.88622909	5	5	4
25	8	5.03	8	1.467752	8.099639	-0.099639	0.00992801	1	1	8
26	8	5.16	8	1.995445	9.387103	-1.387103	1.92405535	-7	0	16
27	8	5.28	15	-0.589797	6.927393	8.0726071	65.1669847	-15	0	24
28	8	5.40	15	1.754627	9.391706	5.6082938	31.452957	-15	0	31
29	8	5.52	8	-2.027106	5.724766	2.2752344	5.17669138	-15	0	38
30	8	5.63	8	-1.434188	6.427313	1.5726871	2.47334493	-15	0	38
31	8	5.73	0	1.593117	9.559406	-9.559406	91.3822359	-8	0	31
32	8	5.83	1	1.467752	9.534204	-8.534204	72.8326296	-1	0	16
33	8	5.93	8	1.995445	10.15764	-2.157637	4.65539662	-1	0	9
34	8	6.02	8	-0.589797	7.663908	0.3360919	0.11295777	-1	0	9
35	8	6.11	8	1.754627	10.09571	-2.095705	4.39197945	-9	0	17
36	9	6.19	16	-2.027106	6.397683	9.6023167	92.2044869	-16	0	24
37	10	6.31	8	-1.434188	7.114671	0.8853291	0.78380761	-16	0	32
38	11	6.48	8	0.290626	9.002225	-1.002225	1.00445462	-16	0	32
39	12	6.68	8	-1.052152	7.859152	0.1408478	0.01983811	-16	0	32
40	13	6.91	14	-0.698921	8.447421	5.5525794	30.8311386	-8	0	24
	mean of the disturbance			0.03784		1.9927141	mean of the standard errors			
	std dev of the disturbance			1.163369						

				constraints	
Σ (AO-Ot)2	459.7285				
θ	0.04		>=0	<=1	
αs	0.63		>=0	<=1	
β	0.00		>=0	<=1	
S'	3.56		>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

NAPOLY GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.906196	4	-1.836858	0.047651	3.9523492	15.6210641	12	12	12
2	4	1.607094	4	-0.306072	2.279336	1.7206644	2.96068585	12	12	12
3	4	2.149204	4	-1.037138	2.09038	1.9096203	3.64864966	12	12	12
4	4	2.5685	4	-0.972863	2.573951	1.4260492	2.03361625	12	12	12
5	7	2.892805	4	-0.560611	3.310507	0.6894929	0.47540049	12	12	12
6	7	3.823286	8	0.476798	6.044245	1.9557552	3.82497847	9	9	12
7	10	4.542967	8	2.993832	9.722887	-1.722887	2.96834109	6	6	16
8	15	5.779252	12	-1.242923	7.930193	4.0698068	16.5633277	0	0	20
9	5	7.868203	20	-0.550071	10.06416	9.9358427	98.7209709	-11	0	28
10	8	7.218415	18	-0.249281	8.7434	9.2566	85.6846428	-8	0	40
11	6	7.395482	10	0.466598	8.826547	1.1734532	1.37699243	-8	0	50
12	4	7.079337	10	1.378909	8.936834	1.0631661	1.13032206	-10	0	56
13	2	6.381716	10	0.344689	6.719113	3.2808866	10.7642169	-10	0	62
14	4	5.389043	8	1.094136	6.070988	1.929012	3.72108724	-7	0	67
15	8	5.074357	6	1.284515	5.865701	0.1342994	0.01803634	-4	0	68
16	8	5.737158	11	0.882652	5.802719	5.197281	27.0117295	-10	0	72
17	19	6.249803	16	0.945381	5.892214	10.107786	102.167345	-13	0	78
18	20	9.138347	20	0.270514	7.781971	12.218029	149.280232	-20	0	82
19	2	11.59904	25	-1.836858	7.487456	17.512544	306.689204	-28	0	90
20	8	9.42439	12	-0.306072	6.843589	5.156411	26.5885739	-5	0	90
21	8	9.101696	10	0.019714	6.579056	3.4209445	11.7028611	2	2	87
22	4	8.852108	0	-0.370241	2.814408	-2.814408	7.92088997	19	19	72
23	0	7.752868	0	-1.630384	0	0	0	40	40	47
24	0	5.996463	0	0.846758	0	0	0	63	63	24
25	8	4.637971	0	0.392744	0	0	0	83	83	4
26	8	5.399635	0	-0.172799	0	0	0	79	79	0
27	8	5.988745	0	0.086418	0	0	0	71	71	0
28	15	6.444393	4	-0.377743	0	4	16	63	63	0
29	15	8.382657	0	0.038913	0.857551	-0.857551	0.7353942	48	48	4
30	8	9.881809	8	-0.016985	6.130044	1.8699562	3.49673601	33	33	4
31	8	9.455487	8	-0.528572	6.586555	1.4134445	1.99782537	25	25	12
32	0	9.125748	4	-0.484163	6.998436	-2.998436	8.99061606	21	21	16
33	1	7.058319	0	-0.185336	4.905915	-4.905915	24.0879994	21	21	20
34	8	5.685813	4	-0.433146	2.14646	1.8535397	3.43560941	28	28	12
35	8	6.21009	4	-0.93051	2.497293	1.5027074	2.25812939	28	28	8
36	8	6.615592	4	-2.244955	2.60948	1.3905205	1.93354713	24	24	8
37	16	6.929228	12	2.931801	9.818212	2.181788	4.76019887	16	16	12
38	8	8.984202	10	0.019714	11.37665	-1.376651	1.89516734	4	4	20
39	8	8.761232	10	-0.370241	11.29898	-1.298976	1.6873382	0	0	26
40	8	8.588776	10	-1.630384	9.380497	0.6195027	0.38378363	-4	0	32
	mean of the disturbance			-0.071602		2.6700127	mean of the standard errors			
	std dev of the disturbance			0.977297						

Σ (AO-Ot)2	91.2661		constraints	
θ	0.23		>=0	<=1
αs	0.26		>=0	<=1
β	0.32		>=0	<=1
S'	19.64		>=0	<=100

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

NAPOLY GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.031369	4	-1.090617	2.490953	1.5090471	2.2772232	12	12	12
2	4	0.062491	4	-0.045398	3.567295	0.4327054	0.18723396	12	12	12
3	4	0.09337	2	1.650156	5.293727	-3.293727	10.8488376	12	12	12
4	4	0.124006	4	-0.481544	3.192663	0.8073372	0.65179335	12	12	10
5	4	0.154402	2	0.694764	4.399367	-2.399367	5.75696316	12	12	10
6	4	0.18456	4	1.363381	5.098143	-1.098143	1.20591733	12	12	8
7	8	0.214482	4	-1.180643	3.161451	0.838549	0.7031645	10	10	10
8	8	0.275537	5	0.704276	6.262247	-1.262247	1.59326754	6	6	10
9	12	0.336113	15	-0.175585	7.175196	7.8248036	61.2275508	0	0	13
10	20	0.427583	10	0.058263	7.500515	2.4994849	6.2474247	-8	0	24
11	18	0.581073	14	0.70271	8.298451	5.7015487	32.5076576	-24	0	30
12	10	0.717676	24	-0.020441	7.711903	16.288097	265.302098	-37	0	39
13	10	0.790469	20	0.396298	8.201435	11.798565	139.206127	-40	0	56
14	10	0.862692	20	-1.557537	6.319823	13.680177	187.147241	-48	0	74
15	8	0.934348	25	0.987225	8.936241	16.063759	258.044359	-53	0	89
16	6	0.989758	5	1.494102	9.498528	-4.498528	20.2367537	-49	0	102
17	11	1.029049	5	-1.588314	6.455403	-1.455403	2.11819933	-43	0	95
18	16	1.107243	13	-0.416999	7.704922	5.295078	28.0378509	-29	0	75
19	20	1.224034	20	-1.497653	6.741049	13.258951	175.799773	-30	0	73
20	25	1.371278	10	1.650156	10.0361	-0.036103	0.00130342	-25	0	68
21	12	1.556579	10	0.692058	9.263306	0.7366954	0.54272005	-25	0	53
22	10	1.638478	7	-0.74297	7.910176	-0.910176	0.82842109	-14	0	40
23	0	1.70405	7	-0.222462	8.496257	-1.496257	2.23878376	-4	0	27
24	0	1.690687	5	-1.936744	5.036377	-0.036377	0.00132331	6	6	24
25	0	1.677428	0	1.332094	5.4049	-5.4049	29.2129479	16	16	19
26	0	1.664273	0	-0.25461	1.784102	-1.784102	3.1830213	23	23	12
27	0	1.651222	0	0.233885	0.238606	-0.238606	0.05693297	30	30	5
28	0	1.638273	0	0.659717	0	0	0	35	35	0
29	4	1.625425	10	-1.769293	0	10	100	35	35	0
30	0	1.644047	4	-0.250781	0	4	16	31	31	10
31	8	1.631154	5	-1.220592	0	5	25	31	31	14
32	8	1.681099	3	1.273972	3.32951	-0.32951	0.10857713	23	23	19
33	4	1.730653	0	1.225077	4.484992	-4.484992	20.1151524	19	19	18
34	0	1.74845	4	0.058453	4.490987	-0.490987	0.24108811	15	15	18
35	4	1.734738	2	0.553804	3.529099	-1.529099	2.33814252	20	20	17
36	4	1.752503	5	0.932114	3.925173	1.0748275	1.15525408	20	20	15
37	4	1.770128	10	-0.5761	2.145878	7.8541215	61.6872248	21	21	15
38	12	1.787615	8	0.018469	3.335345	4.6646547	21.7590032	19	19	23
39	10	1.967702	8	2.032788	8.894219	-0.894219	0.79962737	7	7	31
40	10	1.931477	12	-0.304962	8.641184	3.3588162	11.2816464	-1	0	37
	mean of the disturbance			0.036521		2.4281792	mean of the standard errors			
	std dev of the disturbance			1.051467						

Σ (AO-Ot)2	298.5498		constraints	
θ	0.01		>=0	<=1
αs	0.29		>=0	<=1
β	0.00		>=0	<=1
S'	24.30		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)*eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0,eIO+\alpha s(s'-S_t-\beta SL_t)+\varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

NAPOLY GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

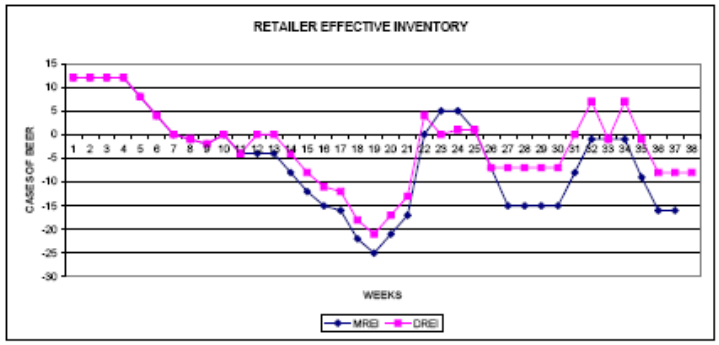
FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	3.708627	4	0.848343	0	4	16	12	12	8
2	4	3.978775	0	0.808666	0	0	0	12	12	8
3	4	3.998454	4	-1.459994	0	4	16	12	12	4
4	2	3.999887	4	-0.133739	0	4	16	12	12	4
5	4	2.145678	0	-1.600212	0	0	0	10	10	8
6	2	3.864925	4	0.674476	0	4	16	10	10	4
7	4	2.135847	2	1.354605	0	2	4	12	12	4
8	4	3.864209	2	0.2928	0	2	4	8	8	6
9	5	3.990109	2	0.750115	0	2	4	8	8	4
10	15	4.926436	5	-0.61185	0	5	25	5	5	4
11	10	14.26821	12	-0.82302	13.61468	-1.614677	2.60718246	-8	0	7
12	14	10.31076	12	0.435332	10.91759	1.0824148	1.17162171	-16	0	17
13	24	13.73126	25	-1.076646	12.82611	12.173893	148.20368	-25	0	24
14	20	23.25199	15	2.47254	25.89602	-10.89602	118.72325	-37	0	37
15	20	20.23689	25	1.069541	21.47792	3.5220848	12.405081	-45	0	40
16	25	20.01726	25	3.011873	23.20062	1.7993835	3.23778095	-40	0	40
17	5	24.63704	25	0.227266	25.03579	-0.035794	0.00128124	-50	0	50
18	5	6.430426	20	-0.425291	6.176624	13.823376	191.085719	-30	0	50
19	13	5.104197	10	-0.43028	4.845405	5.1545947	26.5698467	-10	0	45
20	20	12.42484	10	-1.24258	9.353752	0.646248	0.41763647	2	2	30
21	10	19.4482	10	0.48978	18.10947	-8.109469	65.7634838	2	2	20
22	10	10.68824	5	-1.181357	7.678369	-2.678369	7.17366111	2	2	20
23	7	10.05013	2	0.246608	8.46823	-6.46823	41.8379957	2	2	15
24	7	7.222182	2	-0.405879	1.987791	0.0122092	0.00014907	5	5	7
25	5	7.016184	2	0.722194	4.909866	-2.909866	8.46732274	3	3	4
26	0	5.148865	0	1.90786	7.226014	-7.226014	52.2152775	0	0	4
27	0	0.374915	0	1.253041	0	0	0	2	2	2
28	0	0.02731	0	-0.232053	0	0	0	4	4	0
29	0	0.001989	0	-0.145268	0	0	0	4	4	0
30	10	0.000145	5	-0.750428	0	5	25	4	4	0
31	4	9.271578	4	-0.36249	9.080576	-5.080576	25.812257	-6	0	5
32	5	4.383999	5	-1.336199	3.219288	1.7807118	3.17093463	-10	0	9
33	3	4.955128	2	1.90786	7.034277	-5.034277	25.3439441	-10	0	9
34	0	3.142418	0	1.253041	4.566947	-4.566947	20.8570076	-9	0	7
35	4	0.228904	2	-0.232053	0.16834	1.8316602	3.35497914	-4	0	2
36	2	3.725301	2	-0.145268	3.751521	-1.751521	3.06782522	-6	0	2
37	5	2.125677	5	-0.750428	1.546737	3.4532635	11.9250286	-8	0	4
38	10	4.790625	10	-0.36249	4.599624	5.4003764	29.1640658	-11	0	7
39	8	9.620532	25	-1.336199	8.455821	16.544179	273.709853	-19	0	15
40	8	8.118045	25	1.90786	10.19719	14.802807	219.123086	-22	0	35
	mean of the disturbance			0.207891		0.5487525	mean of the standard errors			
	std dev of the disturbance			1.132542						

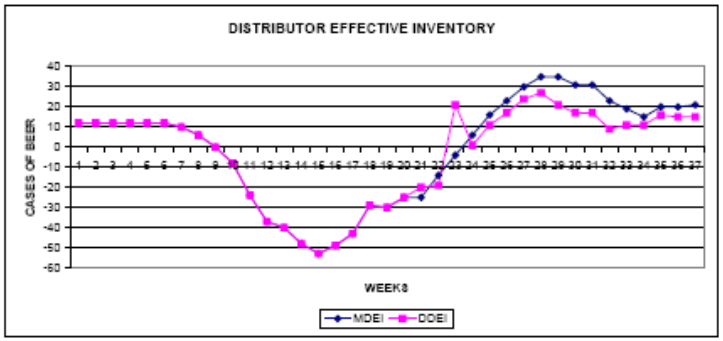
Σ (AO-Ot)2	515.9969		constraints	
θ	0.93		>=0	<=1
αs	1.00		>=0	<=1
β	0.00		>=0	<=1
S'	0.17		>=0	<=100
	GRG NonLinear			

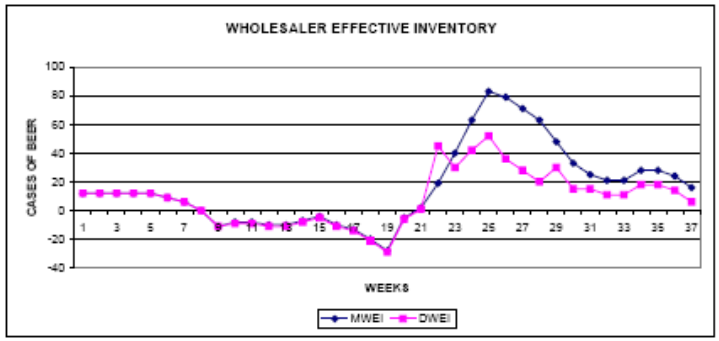
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

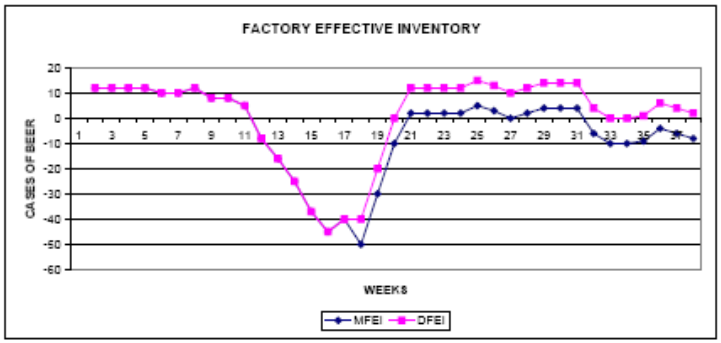
NAPOLY GAME MODEL WEEKS 21 TO 40

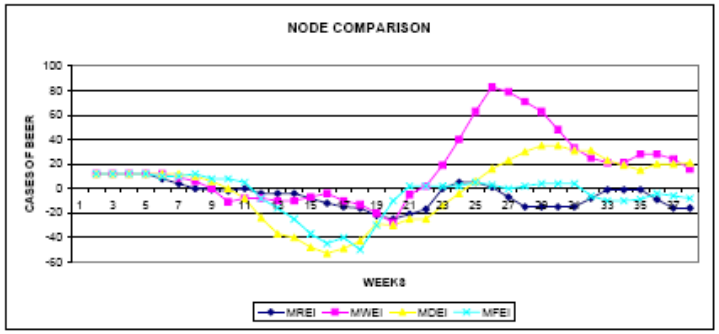
MODEL CHARTS





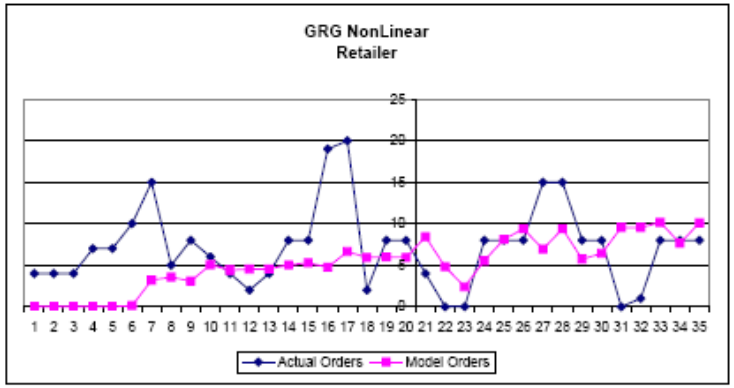


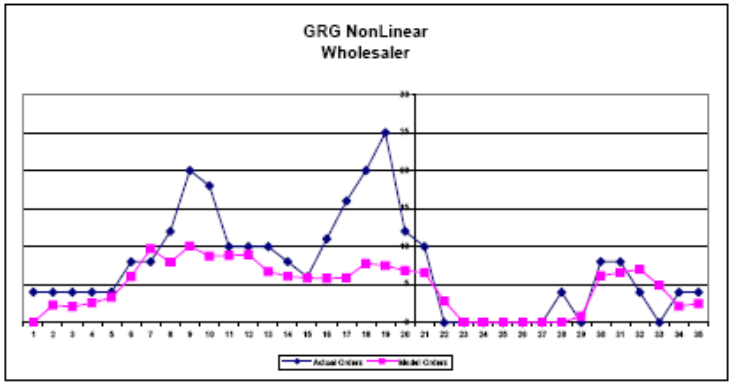


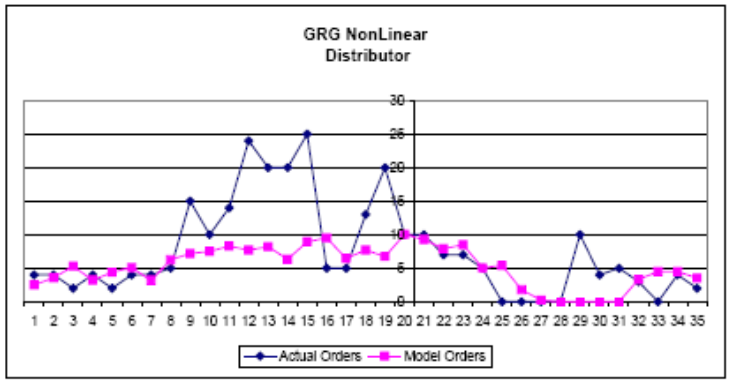


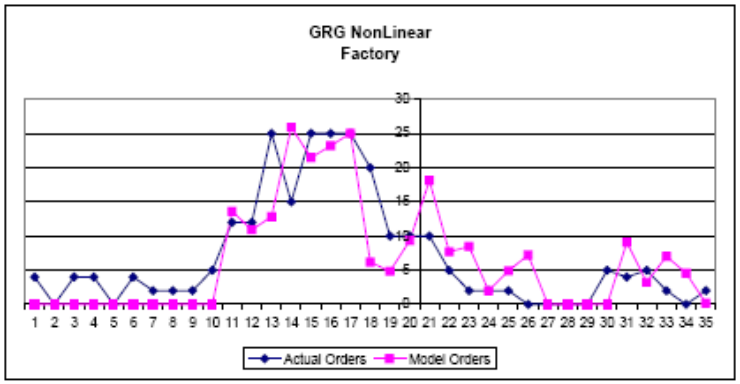
NAPOLY GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









NAPOLY GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	NAPOLY	No IT								NAPOLY	Retailer	No IT				
	Team Costs	$ 1,936.00								Costs	$ 345.50					
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	4	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	7	4	12		16	4
5	8	16	4	4	0	8	8	8	*8*	28	7	7	15		16	4
6	8	12	4	7	0	8	4	4	*4*	30	10	7	18		16	4
7	8	8	7	7	0	8	0	0	*0*	30	15	10	24		13	4
8	8	7	7	10	1	7	0	-1	*-1*	31	5	15	32		10	4
9	8	7	10	4	2	7	0	-2	*-2*	33	8	5	30		4	8
10	8	10	4	8	0	10	0	0	*0*	33	6	8	28		8	8
11	8	4	8	8	4	4	0	-4	*-4*	37	4	6	30		8	4
12	8	8	8	4	4	8	0	-4	*0*	41	2	4	26		4	4
13	8	8	4	4	4	8	0	-4	*0*	45	4	2	20		4	5
14	8	4	4	5	8	4	0	-8	*-4*	53	8	4	20		5	7
15	8	4	5	7	12	4	0	-12	*-8*	65	8	8	24		7	2
16	8	5	7	2	15	5	0	-15	*-11*	80	19	8	27		2	5
17	8	7	2	5	16	7	0	-16	*-12*	96	20	19	39		5	12
18	8	2	5	12	22	2	0	-22	*-18*	118	2	20	57		12	12
19	8	5	12	12	25	5	0	-25	*-21*	143	8	2	54		12	25
20	8	12	12	25	21	12	0	-21	*-17*	164	8	8	50		25	15
21	8	12	25	13	17	12	0	-17	*-13*	181	4	8	46		15	25
22	8	25	13	8	0	25	0	0	*4*	181	0	4	25		27	25
23	8	13	8	4	0	8	5	5	*0*	183.5	0	0	12		44	23
24	8	13	4	0	0	8	5	5	*1*	186	8	0	4		63	20
25	8	9	0	0	0	8	1	1	*1*	186.5	8	8	8		83	4
26	8	1	0	8	7	1	0	-7	*-7*	193.5	8	8	16		87	0
27	8	0	8	8	15	0	0	-15	*-7*	208.5	15	8	24		79	0
28	8	8	8	8	15	8	0	-15	*-7*	223.5	15	15	31		71	0
29	8	8	8	15	15	8	0	-15	*-7*	238.5	8	15	38		63	0
30	8	8	15	15	15	8	0	-15	*-7*	253.5	8	8	38		48	0
31	8	15	15	8	8	15	0	-8	*0*	261.5	0	8	31		33	4
32	8	15	8	8	1	15	0	-1	*7*	262.5	1	0	16		29	0
33	8	8	8	0	1	8	0	-1	*-1*	263.5	8	1	9		21	8
34	8	8	0	1	1	8	0	-1	*7*	264.5	8	8	9		29	8
35	8	0	1	8	9	0	0	-9	*-1*	273.5	8	8	17		36	4
36	8	1	8	8	16	1	0	-16	*-8*	289.5	16	8	24		32	0
37	8	8	8	8	16	8	0	-16	*-8*	305.5	8	16	32		24	4
38	8	8	8	16	16	8	0	-16	*-8*	321.5	8	8	32		20	4
39	8	8	16	8	16	8	0	-16	*-8*	337.5	8	8	32		8	4
40	8	16	8	4	8	16	0	-8	*-6*	345.5	14	8	24		4	12

NAPOLY GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

	STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews						
					NAPOLY Costs	Wholesaler $ 509.50		No IT									NAPOLY Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	4	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	4	4	12		16	4	4	0	12	12	*12*
5	4	0	12	12	*12*	30	4	4	12		16	4	2	0	12	12	*12*
6	4	0	9	9	*9*	34.5	8	4	12		16	2	4	0	12	12	*12*
7	4	0	6	6	*6*	37.5	8	8	16		14	4	2	0	10	10	*10*
8	8	0	0	0	*0*	37.5	12	8	20		14	2	4	0	6	6	*6*
9	8	11	0	-11	*-11*	48.5	20	12	28		8	4	4	0	0	0	*0*
10	4	8	0	-8	*-9*	56.5	18	20	40		4	4	5	8	0	-8	*-8*
11	4	8	0	-8	*-9*	64.5	10	18	50		4	5	7	24	0	-24	*-24*
12	5	10	0	-10	*-11*	74.5	10	10	56		5	7	2	37	0	-37	*-37*
13	7	10	0	-10	*-11*	84.5	10	10	62		7	2	5	40	0	-40	*-40*
14	2	7	0	-7	*-8*	91.5	8	10	67		2	5	12	48	0	-48	*-48*
15	5	4	0	-4	*-5*	95.5	6	8	68		5	12	12	53	0	-53	*-53*
16	12	10	0	-10	*-11*	105.5	11	6	72		12	12	25	49	0	-49	*-49*
17	12	13	0	-13	*-14*	118.5	16	11	78		12	25	15	43	0	-43	*-43*
18	25	20	0	-20	*-21*	138.5	20	16	82		25	15	25	29	0	-29	*-29*
19	15	28	0	-28	*-29*	166.5	25	20	90		15	25	25	30	0	-30	*-30*
20	25	5	0	-5	*-6*	171.5	12	25	90		25	25	23	25	0	-25	*-25*
21	25	0	2	2	*1*	172.5	10	12	87		25	23	20	25	0	-25	*-20*
22	23	0	19	19	*45*	182	0	10	72		23	20	10	14	0	-14	*-19*
23	20	0	40	40	*30*	202	0	0	47		20	10	10	4	0	-4	*21*
24	4	0	63	63	*42*	233.5	0	0	24		10	10	7	0	6	6	*1*
25	0	0	83	83	*52*	275	0	0	4		16	7	7	0	16	16	*11*
26	0	0	79	79	*36*	314.5	0	0	0		23	7	5	0	23	23	*17*
27	0	0	71	71	*28*	350	0	0	0		30	5	0	0	30	30	*24*
28	0	0	63	63	*20*	381.5	4	0	0		35	0	0	0	35	35	*27*
29	0	0	48	48	*30*	405.5	0	4	4		35	0	0	0	35	35	*21*
30	4	0	33	33	*15*	422	8	0	4		35	0	0	0	31	31	*17*
31	0	0	25	25	*15*	434.5	8	8	12		31	0	4	0	31	31	*17*
32	8	0	21	21	*11*	445	4	8	16		31	4	0	0	23	23	*9*
33	8	0	21	21	*11*	455.5	0	4	20		27	0	5	0	19	19	*11*
34	4	0	28	28	*18*	469.5	4	0	12		19	5	4	0	15	15	*11*
35	0	0	28	28	*18*	483.5	4	4	8		20	4	5	0	20	20	*16*
36	4	0	24	24	*14*	495.5	4	4	8		24	5	2	0	20	20	*15*
37	4	0	16	16	*6*	503.5	12	4	12		25	2	0	0	21	21	*15*
38	4	0	4	4	*-6*	505.5	10	12	20		23	0	2	0	19	19	*15*
39	12	0	0	0	*-10*	505.5	10	10	26		19	2	2	0	7	7	*17*
40	9	4	0	-4	*-14*	509.5	10	10	32		9	2	5	1	0	-1	*0*

NAPOLY GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		No IT									NAPOLY	Factory	No IT		
	$ 649.50											Costs	$ 431.50			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	0	8	
3	18	2	4	12		16	4	0	0	12	12	*12*	18	4	4	
4	24	4	2	10		16	0	4	0	12	12	*12*	24	4	4	
5	30	2	4	10		12	4	4	0	10	10	*10*	29	0	8	
6	36	4	2	8		14	4	0	0	10	10	*10*	34	4	4	
7	41	4	4	10		14	0	4	0	12	12	*12*	40	2	4	
8	44	5	4	10		12	4	2	0	8	8	*8*	44	2	6	
9	44	15	5	13		12	2	2	0	8	8	*8*	48	2	4	
10	52	10	15	24		10	2	2	0	5	5	*5*	50.5	5	4	
11	76	14	10	30		7	2	5	8	0	-8	*-8*	58.5	12	7	
12	113	24	14	39		2	5	12	16	0	-16	*-16*	74.5	12	17	
13	153	20	24	56		5	12	12	25	0	-25	*-25*	99.5	25	24	
14	201	20	20	74		12	12	25	37	0	-37	*-37*	136.5	15	37	
15	254	25	20	89		12	25	15	45	0	-45	*-45*	181.5	25	40	
16	303	5	25	102		25	15	25	40	0	-40	*-40*	221.5	25	40	
17	346	5	5	95		15	25	25	50	0	-50	*-40*	271.5	25	50	
18	375	13	5	75		25	25	25	30	0	-30	*-20*	301.5	20	50	
19	405	20	13	73		25	25	20	10	0	-10	*0*	311.5	10	45	
20	430	10	20	68		25	20	10	0	2	2	*12*	312.5	10	30	
21	455	10	10	53		22	10	10	0	2	2	*12*	313.5	10	20	
22	469	7	10	40		12	10	10	0	2	2	*12*	314.5	5	20	
23	473	7	7	27		12	10	5	0	2	2	*12*	315.5	2	15	
24	476	5	7	24		12	5	2	0	5	5	*15*	318	2	7	
25	484	0	5	19		10	2	2	0	3	3	*13*	319.5	2	4	
26	495.5	0	0	12		5	2	2	0	0	0	*10*	319.5	0	4	
27	510.5	0	0	5		2	2	0	0	2	2	*12*	320.5	0	2	
28	528	0	0	0		4	0	0	0	4	4	*14*	322.5	0	0	
29	545.5	10	0	0		4	0	0	0	4	4	*14*	324.5	0	0	
30	561	4	10	10		4	0	0	0	4	4	*14*	326.5	5	0	
31	576.5	5	4	14		4	0	5	6	0	-6	*4*	332.5	4	5	
32	588	3	5	19		0	5	4	10	0	-10	*0*	342.5	5	9	
33	597.5	0	3	18		5	4	5	10	0	-10	*0*	352.5	2	9	
34	605	4	0	18		4	5	2	9	0	-9	*1*	361.5	0	7	
35	615	2	4	17		5	2	0	4	0	-4	*6*	365.5	2	2	
36	625	5	2	15		2	0	2	6	0	-6	*4*	371.5	2	2	
37	635.5	10	5	15		0	2	2	8	0	-8	*2*	379.5	5	4	
38	645	8	10	23		2	2	5	11	0	-11	*0*	390.5	10	7	
39	648.5	8	8	31		2	5	10	19	0	-19	*0*	409.5	25	15	
40	649.5	12	8	37		5	10	25	22	0	-22	*0*	431.5	25	35	

NAPOLY GAME MODEL WEEKS 21 TO 40 MODEL DATA

NAPOLY No IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	0	12
3	4	12	4	12	2	12	4	12
4	7	12	4	12	4	12	4	12
5	7	8	4	12	2	12	0	10
6	10	4	8	9	4	12	4	10
7	15	0	8	6	4	10	2	12
8	5	-1	12	0	5	6	2	8
9	8	-2	20	-11	15	0	2	8
10	6	0	18	-9	10	-8	5	5
11	4	-4	10	-9	14	-24	12	-8
12	2	0	10	-11	24	-37	12	-16
13	4	0	10	-11	20	-40	25	-25
14	8	-4	8	-8	20	-48	15	-37
15	8	-8	6	-5	25	-53	25	-45
16	19	-11	11	-11	5	-49	25	-40
17	20	-12	16	-14	5	-43	25	-40
18	2	-18	20	-21	13	-29	20	-20
19	8	-21	25	-29	20	-30	10	0
20	8	-17	12	-6	10	-25	10	12
21	4	-13	10	1	10	-20	10	12
22	0	4	0	45	7	-19	5	12
23	0	0	0	30	7	21	2	12
24	8	1	0	42	5	1	2	15
25	8	1	0	52	0	11	2	13
26	8	-7	0	36	0	17	0	10
27	15	-7	0	28	0	24	0	12
28	15	-7	4	20	0	27	0	14
29	8	-7	0	30	10	21	0	14
30	8	-7	8	15	4	17	5	14
31	0	0	8	15	5	17	4	4
32	1	7	4	11	3	9	5	0
33	8	-1	0	11	0	11	2	0
34	8	7	4	18	4	11	0	1
35	8	-1	4	18	2	16	2	6
36	16	-8	4	14	5	15	2	4
37	8	-8	12	6	10	15	5	2
38	8	-8	10	-6	8	15	10	0
39	8	-8	10	-10	8	17	25	0
40	14	-6	10	-14	12	0	25	0

NORTH EAST GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.620138	27.43839	-23.43839	549.358	12	12	12
2	4	1.25	4	-0.665888	27.40434	-23.40434	547.763086	12	12	12
3	4	2.11	4	-1.610107	27.32024	-23.32024	543.833382	12	12	12
4	4	2.70	4	0.502667	30.02391	-26.02391	677.244116	12	12	12
5	8	3.11	8	-2.163067	29.11784	-21.11784	445.96331	8	8	12
6	8	4.64	8	-1.566735	32.15226	-24.15226	583.331474	4	4	16
7	8	5.69	12	0.015723	35.69164	-23.69164	561.293786	0	0	20
8	8	6.41	16	0.577509	36.08096	-20.08096	403.244972	-4	0	28
9	8	6.91	8	0.154003	35.25884	-27.25884	743.044405	-4	0	36
10	8	7.25	8	-1.872065	33.57379	-25.57379	654.018876	-4	0	36
11	8	7.49	8	1.243102	36.92324	-28.92324	836.553931	-4	0	36
12	8	7.65	8	0.096287	35.48988	-27.48988	755.693501	-8	0	40
13	8	7.76	10	0.763433	35.8201	-25.8201	666.67767	-12	0	44
14	8	7.83	8	-1.584942	33.32394	-25.32394	641.302073	-12	0	48
15	8	7.89	8	2.347445	37.30852	-29.30852	858.989289	-12	0	48
16	8	7.92	10	-1.676314	33.43249	-23.43249	549.081581	-11	0	45
17	8	7.95	10	-1.48708	33.42261	-23.42261	548.618452	-11	0	47
18	8	7.96	11	0.814041	35.18127	-24.18127	584.734029	-14	0	52
19	8	7.97	19	-0.563649	33.47959	-14.47959	209.658389	-14	0	55
20	8	7.98	27	-0.4264	32.3942	-5.394196	29.0973536	-14	0	66
21	8	7.99	31	-0.315751	30.60846	0.3915428	0.15330575	-12	0	83
22	8	7.99	28	-0.00851	28.57009	-0.570093	0.32500838	-10	0	104
23	8	7.99	18	0.149832	26.1579	-8.157901	66.5513526	-13	0	127
24	8	8.00	24	-1.31708	23.68589	0.3141067	0.09866301	-12	0	136
25	8	8.00	25	-1.010036	21.75666	3.2433402	10.5192553	-16	0	156
26	8	8.00	25	2.159037	22.1297	2.8703011	8.23862832	-24	0	181
27	8	8.00	23	-1.706875	15.46749	7.5325111	56.7387234	-32	0	206
28	8	8.00	23	-1.10401	13.49763	9.5023735	90.2951016	-40	0	229
29	8	8.00	21	0.304516	12.89267	8.1073257	65.7287304	-43	0	247
30	8	8.00	14	-1.519094	9.614877	4.3851227	19.2293014	-43	0	260
31	8	8.00	8	-1.778717	8.907883	-0.907883	0.82425074	-41	0	264
32	8	8.00	11	0.520948	12.55014	-1.550136	2.40292116	-29	0	252
33	8	8.00	0	0.164078	12.97645	-12.97645	168.388299	-19	0	245
34	8	8.00	0	-0.04129	13.88987	-13.88987	192.928624	-17	0	235
35	8	8.00	0	-1.547946	0	0	0	87	87	123
36	9	8.00	0	-2.379454	0	0	0	99	99	103
37	10	8.31	0	1.188058	0	0	0	111	111	83
38	11	8.84	0	0.009734	0	0	0	123	123	63
39	12	9.52	0	-0.254654	0	0	0	135	135	43
40	13	10.29	0	0.678436	0	0	0	137	137	33
	mean of the disturbance			-0.386623		-13.35839	mean of the standard errors			
	std dev of the disturbance			1.15947						

Σ (AO-Ot)2	682.4222		constraints		
θ	0.31		>=0	<=1	
αs	0.34		>=0	<=1	
β	0.33		>=0	<=1	
S'	95.21		>=0	<=100	

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

NORTH EAST GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	2.763132	4	0.981409	21.40598	-17.40598	302.968182	12	12	12
2	4	3.61754	4	0.143407	21.42239	-17.42239	303.53956	12	12	12
3	4	3.881737	4	-2.329044	19.21413	-15.21413	231.469844	12	12	12
4	4	3.963431	4	0.214694	21.83957	-17.83957	318.250089	12	12	12
5	4	3.988692	4	-2.552215	19.09792	-15.09792	227.94712	12	12	12
6	8	3.996503	4	-0.092567	21.56538	-17.56538	308.542452	12	12	12
7	8	6.762051	4	-0.266654	25.68369	-21.68369	470.182563	8	8	12
8	12	7.617205	8	0.981409	29.31377	-21.31377	454.27668	4	4	12
9	16	10.64477	8	0.143407	32.44277	-24.44277	597.448949	-4	0	16
10	8	14.34407	12	0.805901	36.21715	-24.21715	586.470555	-16	0	20
11	8	9.961694	12	-0.086334	29.76771	-17.76771	315.691645	-20	0	28
12	8	8.606589	15	-0.800522	27.11101	-12.11101	146.676485	-20	0	32
13	8	8.187568	10	0.030127	26.49466	-16.49466	272.073814	-20	0	39
14	10	8.057999	5	-0.676234	25.51188	-20.51188	420.737075	-19	0	40
15	8	9.399501	9	-0.51164	27.45853	-18.45853	340.717435	-21	0	37
16	8	8.432749	0	-0.154444	26.26156	-26.26156	689.669705	-24	0	41
17	10	8.133813	0	1.4058	28.6977	-28.6977	823.557961	-24	0	33
18	10	9.422944	15	0.367481	30.12334	-15.12334	228.715376	-26	0	25
19	11	9.821564	10	-0.442532	28.97768	-18.97768	360.152304	-26	0	30
20	19	10.63561	10	-0.908602	29.32565	-19.32565	373.480836	-27	0	30
21	27	16.41359	10	0.672715	35.95068	-25.95068	673.437946	-41	0	35
22	31	23.7265	30	2.417312	44.86134	-14.86134	220.859444	-59	0	36
23	28	28.75091	90	-1.171717	42.47853	47.52147	2258.29014	-86	0	62
24	18	28.23219	30	-1.102784	28.81193	1.1880703	1.41151106	-114	0	152
25	24	21.16397	20	-0.585431	17.85545	2.1445502	4.59909573	-132	0	182
26	25	23.12305	10	0.83105	18.29394	-8.293944	68.7895023	-156	0	202
27	25	24.41962	10	-1.19564	16.82955	-6.829552	46.6427778	-176	0	207
28	23	24.82054	20	-0.494706	17.6377	2.3623022	5.58047159	-193	0	209
29	23	23.56294	20	-1.514147	13.89213	6.1078732	37.3061151	-206	0	219
30	21	23.17407	20	0.280713	15.29812	4.7018831	22.1077048	-209	0	219
31	14	21.67226	10	-0.256245	12.96564	-2.965641	8.79502689	-212	0	221
32	8	16.37239	5	0.18046	8.102479	-3.102479	9.62537468	-216	0	221
33	11	10.58889	20	1.767195	19.61903	0.3809678	0.14513648	-112	0	114
34	0	10.87288	20	1.470704	19.60653	0.3934674	0.15481659	-103	0	114
35	0	3.362077	20	1.523463	12.14849	7.8515083	61.6461823	-83	0	114
36	0	1.039611	10	0.110383	8.412947	1.5870535	2.51873873	-63	0	114
37	0	0.321465	5	0.024748	9.077701	-4.077701	16.6276427	-43	0	104
38	0	0.099402	5	-0.398962	9.166195	-4.166195	17.3571795	-33	0	99
39	0	0.030737	5	1.403275	10.1655	-5.165499	26.68238	-33	0	104
40	0	0.009504	0	-0.657186	7.349539	-7.349539	54.0157164	-33	0	109
	mean of the disturbance			-0.026406		-10.7224	mean of the standard errors			
	std dev of the disturbance			1.096124						

Σ (AO-Ot)2	3536.593		constraints		
θ	0.69		>=0	<=1	
αs	0.38		>=0	<=1	
β	0.38		>=0	<=1	
S'	62.89		>=0	<=100	
	Standard GRG NonLinear				

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

NORTH EAST GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	3.820722	4	-0.938972	2.88175	1.1182501	1.25048326	12	12	12
2	4	3.991965	4	-0.354734	3.637231	0.3627691	0.13160145	12	12	12
3	4	3.99964	4	0.436773	4.436413	-0.436413	0.19045591	12	12	12
4	4	3.999984	4	-0.206838	3.793146	0.2068545	0.04278877	12	12	12
5	4	3.999999	4	0.060022	4.060021	-0.060021	0.00360258	12	12	12
6	4	4	4	-0.501239	3.498761	0.5012394	0.25124093	12	12	12
7	4	4	4	-0.243743	3.756256	0.2437435	0.05941089	12	12	12
8	4	4	5	-0.938972	3.061028	1.938972	3.75961231	12	12	12
9	8	4	8	-0.354734	3.645266	4.354734	18.9637081	12	12	13
10	8	7.820722	5	0.436773	8.257495	-3.257495	10.6112708	8	8	17
11	12	7.991965	8	-0.206838	7.785127	0.2148735	0.04617062	4	4	18
12	12	11.82036	8	0.060022	11.98038	-3.980384	15.0573797	-3	0	21
13	15	11.99195	10	-0.501239	11.49071	-1.490709	2.22221433	-7	0	21
14	10	14.86518	10	-0.243743	14.62144	-4.621437	21.3576805	-17	0	26
15	5	10.21806	10	-0.938972	9.279083	0.7209169	0.51972113	-19	0	28
16	9	5.233871	4	-0.354734	4.879137	-0.879137	0.7728815	-16	0	30
17	0	8.831204	4	0.436773	9.267977	-5.267977	27.7515768	-15	0	24
18	0	0.39581	0	-0.206838	0.188972	-0.188972	0.03571044	-5	0	18
19	15	0.01774	0	0.060022	0.077762	-0.077762	0.00604697	5	5	8
20	10	14.3285	0	0.981409	15.30991	-15.30991	234.393372	-6	0	4
21	10	10.194	5	-2.524138	7.669863	-2.669863	7.12816942	-12	0	0
22	10	10.0087	8	2.615776	12.62447	-4.624471	21.3857305	-22	0	5
23	30	10.00039	10	0.915656	10.91605	-0.916046	0.8391398	-32	0	13
24	90	29.10363	20	0.612724	29.71635	-9.716351	94.4074753	-82	0	23
25	30	87.27065	90	0.197199	87.46785	2.532148	6.41177343	-147	0	38
26	20	32.56684	30	0.986884	33.55373	-3.553728	12.6289794	-169	0	120
27	10	20.56324	20	-0.006685	20.55656	-0.556555	0.3097539	-179	0	140
28	10	10.47344	20	0.270003	10.74344	9.2565576	85.683859	-169	0	140
29	20	10.02122	20	-0.013564	10.00766	9.992345	99.8469576	-161	0	142
30	20	19.55276	20	0.303747	19.8565	0.1434977	0.02059158	-171	0	152
31	20	19.97995	20	-0.829778	19.15018	0.8498229	0.72219894	-79	0	60
32	10	19.9991	10	1.229361	21.22846	-11.22846	126.078375	-79	0	60
33	5	10.44816	0	1.355657	11.80381	-11.80381	139.329975	-89	0	50
34	20	5.244184	0	0.16128	5.405463	-5.405463	29.2190331	-54	0	30
35	20	19.33865	0	-0.312979	19.02567	-19.02567	361.976191	-54	0	10
36	20	19.97036	0	0.542985	20.51334	-20.51334	420.797287	-64	0	0
37	10	19.99867	0	-1.885266	18.11341	-18.11341	328.095453	-84	0	0
38	5	10.44814	0	0.703753	11.15189	-11.15189	124.364618	-94	0	0
39	5	5.244183	0	0.817626	6.061809	-6.061809	36.7455291	-99	0	0
40	5	5.010944	5	-1.187162	3.823782	1.1762176	1.38348788	-104	0	0
	mean of the disturbance			0.041181		-2.072398	mean of the standard errors			
	std dev of the disturbance			0.857945						

Σ (AO-Ot)2	1897.375		constraints		
θ	0.98		>=0	<=1	
αs	0.00		>=0	<=1	
β	0.00		>=0	<=1	
S'	0.00		>=0	<=100	
	GRG NonLinear				

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

NORTH EAST GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTOR	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	2.351866	4	-1.793103	37.11632	-33.11632	1096.69049	12	12	8
2	4	3.320913	4	-0.04922	39.82925	-35.82925	1283.735	12	12	8
3	4	3.720194	8	0.818951	41.0967	-33.0967	1095.39147	12	12	8
4	4	3.88471	4	-1.118115	37.88253	-33.88253	1148.02553	12	12	12
5	4	3.952497	8	-0.792028	38.2764	-30.2764	916.660334	12	12	12
6	4	3.980427	4	0.742768	35.83913	-31.83913	1013.72991	16	16	12
7	4	3.991935	0	0.370533	35.4784	-35.4784	1258.71675	16	16	12
8	4	3.996677	4	0.395052	34.39091	-30.39091	923.607262	20	20	4
9	5	3.998631	0	-0.999198	32.99861	-32.99861	1088.90831	20	20	4
10	8	4.587402	15	1.965893	41.55247	-26.55247	705.033881	15	15	4
11	5	6.593895	15	-0.639972	40.98964	-25.98964	675.46114	11	11	15
12	8	5.656738	50	-1.037609	39.24775	10.752248	115.610845	6	6	30
13	8	7.034498	10	-0.050651	21.99826	-11.99826	143.95821	13	13	65
14	10	7.602181	10	1.747899	19.16652	-9.166521	84.0251143	20	20	60
15	10	9.012018	0	-0.753186	0	0	0	60	60	20
16	10	9.592918	0	-1.362651	0	0	0	60	60	10
17	4	9.832269	0	-0.608083	0.664988	-0.664988	0.44220912	60	60	0
18	4	6.40309	0	-0.527173	1.316719	-1.316719	1.73375002	56	56	0
19	0	4.990154	0	-1.793103	2.637854	-2.637854	6.95827188	52	52	0
20	0	2.056111	0	-0.04922	1.447693	-1.447693	2.09581567	52	52	0
21	0	0.847187	0	-1.053081	0	0	0	52	52	0
22	5	0.349069	2	-0.938831	0	2	4	52	52	0
23	8	3.083861	2	0.369426	7.173077	-5.173077	26.7607225	47	47	2
24	10	5.974303	5	-1.430173	15.54331	-10.54331	111.161349	39	39	4
25	20	8.341278	10	-1.892166	24.36707	-14.36707	206.412778	31	31	7
26	90	15.19822	150	-0.406128	47.8248	102.1752	10439.7715	13	13	15
27	30	59.17833	30	-0.528586	52.42559	-22.42559	502.906938	-72	0	160
28	20	42.02245	40	-0.507379	28.08279	11.917206	142.019804	-92	0	180
29	20	29.07399	20	-1.76489	15.52148	4.4785187	20.0571299	38	38	70
30	20	23.73879	10	-0.594774	4.960456	5.0395443	25.3970065	48	48	60
31	20	21.54051	0	1.053754	0	0	0	68	68	30
32	20	20.63474	0	1.207611	1.679093	-1.679093	2.81935398	68	68	10
33	10	20.26153	0	-0.406128	13.29621	-13.29621	176.789167	58	58	0
34	0	14.2281	0	-0.528586	17.14031	-17.14031	293.790315	48	48	0
35	0	5.862453	0	-0.507379	8.795876	-8.795876	77.3674349	48	48	0
36	0	2.415527	0	-1.76489	4.09144	-4.09144	16.7398811	48	48	0
37	0	0.995278	0	-0.594774	3.841306	-3.841306	14.7556344	48	48	0
38	0	0.410088	0	1.053754	4.904645	-4.904645	24.0555395	48	48	0
39	0	0.16897	0	1.207611	4.817383	-4.817383	23.2071799	48	48	0
40	0	0.069621	0	-0.406128	3.104296	-3.104296	9.63665255	48	48	0
	mean of the disturbance			-0.384529		-9.535434	mean of the standard errors			
	std dev of the disturbance			0.975046						

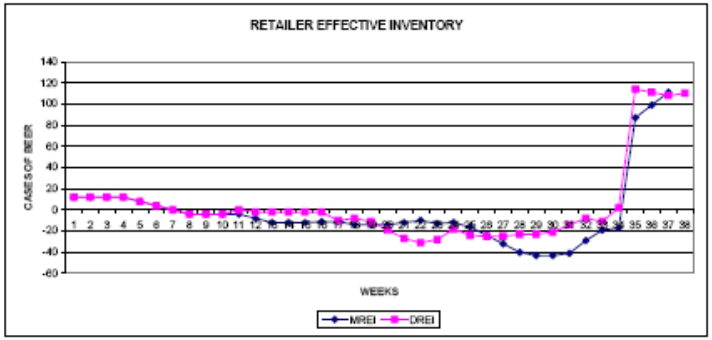
			constraints	
Σ (AO-Ot)2	12117.65			
θ	0.59		>=0	<=1
αs	1.00		>=0	<=1
β	0.36		>=0	<=1
S'	51.44		>=0	<=100

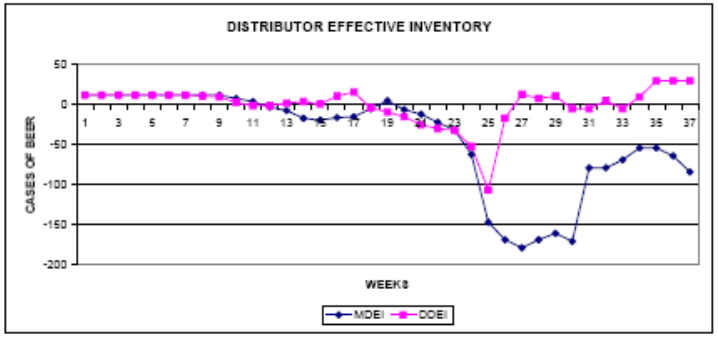
GRG NonLinear

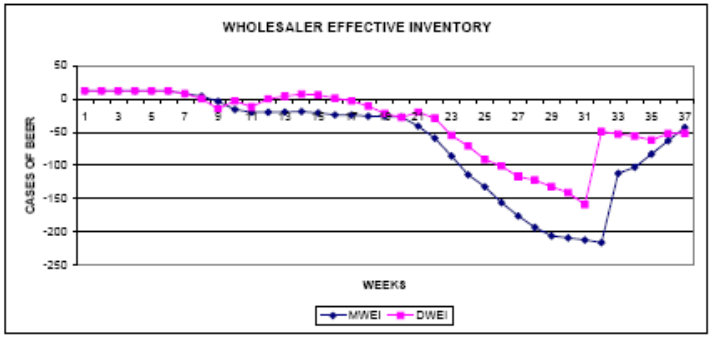
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
$SLt = FSL = FPD1 + FPD2$

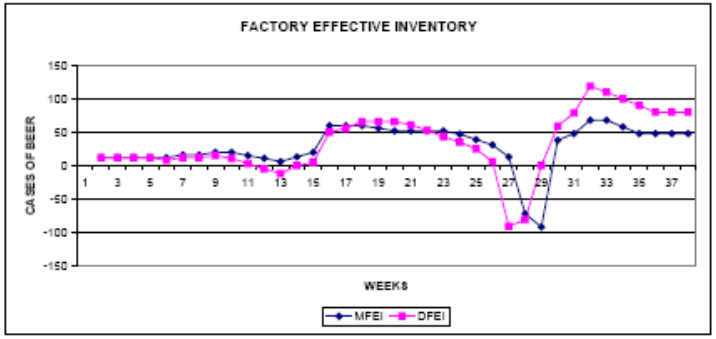
NORTH EAST GAME MODEL WEEKS 21 TO 40

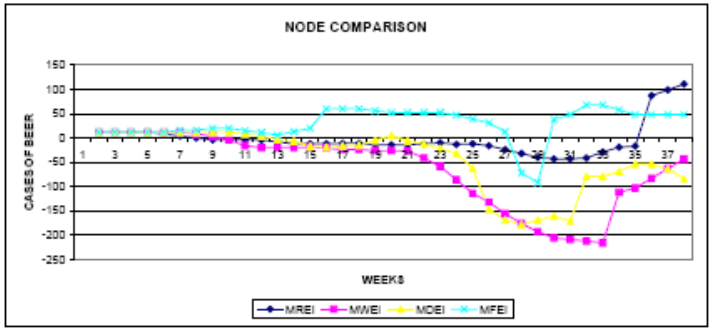
MODEL CHARTS





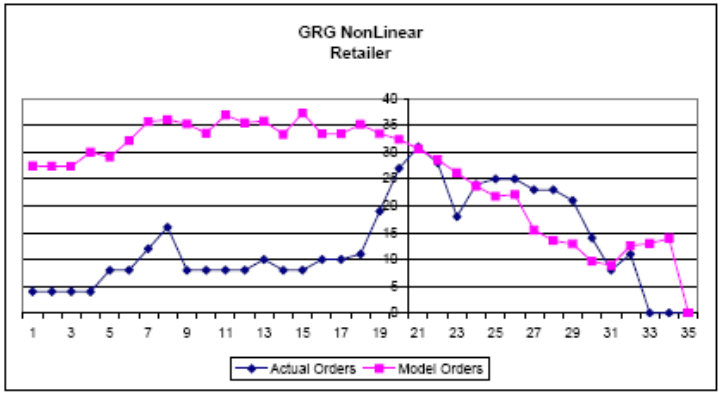


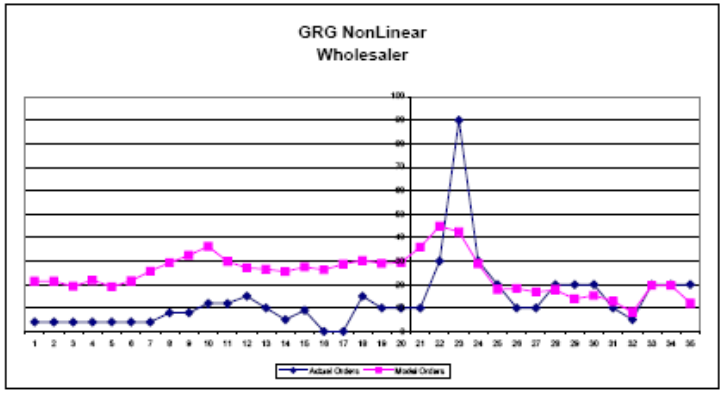


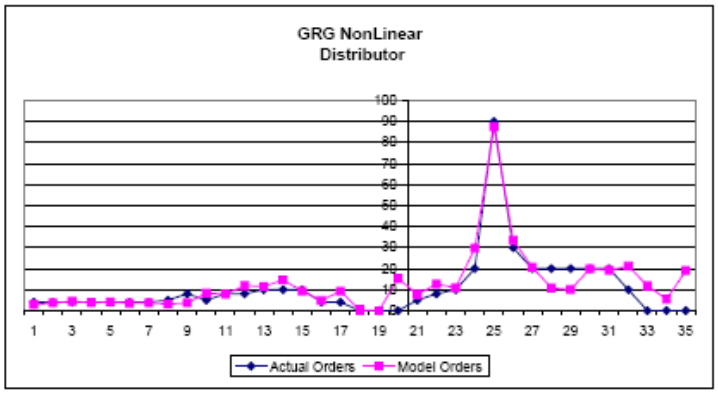


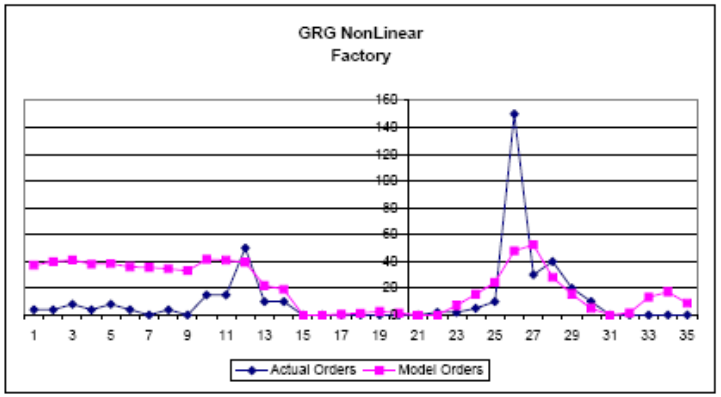
NORTH EAST GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









NORTH EAST GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	NORTH EAST	NO IT							NORTH EAST	Retailer	NO IT					
	Team Costs	$ 6,355.00							Costs	$ 851.00						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	4	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	4	4	12		16	4
5	8	16	4	4	0	8	8	8	*8*	28	8	4	12		16	4
6	8	12	4	4	0	8	4	4	*4*	30	8	8	16		16	4
7	8	8	4	8	0	8	0	0	*0*	30	12	8	20		16	4
8	8	4	8	8	4	4	0	-4	*-4*	34	16	12	28		12	4
9	8	8	8	8	4	8	0	-4	*-4*	38	8	16	36		8	4
10	8	8	8	4	4	8	0	-4	*-4*	42	8	8	36		4	4
11	8	8	4	4	4	8	0	-4	*0*	46	8	8	36		4	8
12	8	4	4	8	8	4	0	-8	*-2*	54	8	8	40		8	8
13	8	4	8	8	12	4	0	-12	*-2*	66	10	8	44		8	9
14	8	8	8	9	12	8	0	-12	*-2*	78	8	10	46		9	8
15	8	8	9	8	12	8	0	-12	*-2*	90	8	8	46		8	5
16	8	9	8	5	11	9	0	-11	*-2*	101	10	8	45		5	8
17	8	8	5	8	11	8	0	-11	*-10*	112	10	10	47		8	8
18	8	5	8	8	14	5	0	-14	*-8*	126	11	10	52		8	10
19	8	8	8	10	14	8	0	-14	*-11*	140	19	11	55		10	10
20	8	8	10	10	14	8	0	-14	*-19*	154	27	19	66		10	5
21	8	10	10	5	12	10	0	-12	*-27*	166	31	27	83		5	9
22	8	10	5	9	10	10	0	-10	*-31*	176	28	31	104		9	4
23	8	5	9	4	13	5	0	-13	*-28*	189	18	28	127		4	0
24	8	9	4	0	12	9	0	-12	*-18*	201	24	18	136		0	0
25	8	4	0	0	16	4	0	-16	*-24*	217	25	24	156		0	0
26	8	0	0	0	24	0	0	-24	*-25*	241	25	25	181		0	5
27	8	0	0	5	32	0	0	-32	*-25*	273	23	25	206		5	8
28	8	0	5	8	40	0	0	-40	*-23*	313	23	23	229		8	10
29	8	5	8	10	43	5	0	-43	*-23*	356	21	23	247		10	20
30	8	8	10	20	43	8	0	-43	*-21*	399	14	21	260		20	18
31	8	10	20	18	41	10	0	-41	*-14*	440	8	14	264		18	10
32	8	20	18	10	29	20	0	-29	*-8*	469	11	8	252		10	112
33	8	18	10	112	19	18	0	-19	*-11*	488	0	11	245		112	20
34	8	10	112	20	17	10	0	-17	*2*	505	0	0	235		20	20
35	8	112	20	20	0	25	87	87	*114*	548.5	0	0	123		20	20
36	8	107	20	20	0	8	99	99	*111*	598	0	0	103		20	20
37	8	119	20	20	0	8	111	111	*108*	653.5	0	0	83		20	10
38	8	131	20	10	0	8	123	123	*110*	715	0	0	63		10	0
39	8	143	10	0	0	8	135	135	*102*	782.5	0	0	43		0	0
40	8	145	0	0	0	8	137	137	*114*	851	0	0	33		0	0

NORTH EAST GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

NORTH EAST Wholesaler NO IT NORTH EAST
Costs $ 2,592.00 Costs

WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL	DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4		12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12	16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12	16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	4	4	12	16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	4	4	12	16	4	4	0	12	12	*12*
5	4	0	12	12	*12*	30	4	4	12	16	4	4	0	12	12	*12*
6	4	0	12	12	*12*	36	4	4	12	16	4	4	0	12	12	*12*
7	4	0	8	8	*8*	40	4	4	12	16	4	4	0	12	12	*12*
8	4	0	4	4	*0*	42	8	4	12	16	4	4	0	12	12	*11*
9	4	4	0	-4	*-15*	46	8	8	16	16	4	4	0	12	12	*10*
10	8	16	0	-16	*-3*	62	12	8	20	16	4	5	0	8	8	*3*
11	8	20	0	-20	*-12*	82	12	12	28	12	5	8	0	4	4	*-1*
12	9	20	0	-20	*0*	102	15	12	32	9	8	5	3	0	-3	*-1*
13	8	20	0	-20	*4*	122	10	15	39	8	5	8	7	0	-7	*2*
14	5	19	0	-19	*7*	141	5	10	40	5	8	8	17	0	-17	*4*
15	8	21	0	-21	*6*	162	9	5	37	8	8	10	19	0	-19	*1*
16	8	24	0	-24	*1*	186	0	9	41	8	10	10	16	0	-16	*11*
17	10	24	0	-24	*-3*	210	0	0	33	10	10	10	15	0	-15	*16*
18	10	26	0	-26	*-11*	236	15	0	25	10	10	4	5	0	-5	*-4*
19	5	26	0	-26	*-22*	262	10	15	30	10	4	4	0	5	5	*-9*
20	9	27	0	-27	*-28*	289	10	10	30	9	4	0	6	0	-6	*-15*
21	4	41	0	-41	*-20*	330	10	10	35	4	0	0	12	0	-12	*-25*
22	0	59	0	-59	*-29*	389	30	10	36	0	0	0	22	0	-22	*-30*
23	0	86	0	-86	*-55*	475	90	30	62	0	0	5	32	0	-32	*-32*
24	0	114	0	-114	*-71*	589	30	90	152	0	5	8	62	0	-62	*-52*
25	5	132	0	-132	*-91*	721	20	30	182	5	8	10	147	0	-147	*-107*
26	8	156	0	-156	*-101*	877	10	20	202	8	10	20	169	0	-169	*-17*
27	10	176	0	-176	*-117*	1053	10	10	207	10	20	18	179	0	-179	*13*
28	20	193	0	-193	*-122*	1246	20	10	209	20	18	10	169	0	-169	*8*
29	18	206	0	-206	*-132*	1452	20	20	219	18	10	112	161	0	-161	*11*
30	10	209	0	-209	*-141*	1661	20	20	219	10	112	20	171	0	-171	*-5*
31	112	212	0	-212	*-159*	1873	10	20	221	112	20	20	79	0	-79	*-5*
32	20	216	0	-216	*-49*	2089	5	10	221	20	20	20	79	0	-79	*5*
33	20	112	0	-112	*-53*	2201	20	5	114	20	20	20	69	0	-69	*-5*
34	20	103	0	-103	*-56*	2304	20	20	114	20	20	10	54	0	-54	*10*
35	20	83	0	-83	*-62*	2387	20	20	114	20	10	0	54	0	-54	*30*
36	10	63	0	-63	*-52*	2450	10	20	114	10	0	0	64	0	-84	*30*
37	0	43	0	-43	*-52*	2493	5	10	104	0	0	0	84	0	-84	*30*
38	0	33	0	-33	*-32*	2526	5	5	99	0	0	0	94	0	-94	*20*
39	0	33	0	-33	*-22*	2559	5	5	104	0	0	0	99	0	-99	*15*
40	0	33	0	-33	*-12*	2592	0	5	109	0	0	0	104	0	-104	*10*

NORTH EAST GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		NO IT								NORTH EAST	Factory	NO IT		
	$ 2,054.50										Costs	$ 857.50			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL
0	0	4	4	12		12	4	4	0	12			0	4	8
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8
3	18	4	4	12		16	4	4	0	12	12	*12*	18	8	8
4	24	4	4	12		16	4	8	0	12	12	*12*	24	4	12
5	30	4	4	12		16	8	4	0	12	12	*8*	30	8	12
6	36	4	4	12		20	4	8	0	16	16	*12*	38	4	12
7	42	4	4	12		20	8	4	0	16	16	*12*	46	0	12
8	48	5	4	12		24	4	0	0	20	20	*15*	56	4	4
9	54	8	5	13		24	0	4	0	20	20	*11*	66	0	4
10	58	5	8	17		20	4	0	0	15	15	*3*	73.5	15	4
11	60	8	5	18		19	0	15	0	11	11	*-5*	79	15	15
12	63	8	8	21		11	15	15	0	6	6	*-12*	82	50	30
13	70	10	8	21		21	15	50	0	13	13	*0*	88.5	10	65
14	87	10	10	26		28	50	10	0	20	20	*5*	98.5	10	60
15	106	10	10	28		70	10	10	0	60	60	*50*	128.5	0	20
16	122	4	10	30		70	10	0	0	60	60	*56*	158.5	0	10
17	137	4	4	24		70	0	0	0	60	60	*66*	188.5	0	0
18	142	0	4	18		60	0	0	0	56	56	*66*	216.5	0	0
19	144.5	0	0	8		56	0	0	0	52	52	*66*	242.5	0	0
20	150.5	0	0	4		52	0	0	0	52	52	*61*	268.5	0	0
21	162.5	5	0	0		52	0	0	0	52	52	*53*	294.5	0	0
22	184.5	8	5	5		52	0	0	0	52	52	*43*	320.5	2	0
23	216.5	10	8	13		52	0	2	0	47	47	*35*	344	2	2
24	278.5	20	10	23		47	2	2	0	39	39	*25*	363.5	5	4
25	425.5	90	20	38		41	2	5	0	31	31	*6*	379	10	7
26	594.5	30	90	120		33	5	10	0	13	13	*-91*	385.5	150	15
27	773.5	20	30	140		18	10	150	72	0	-72	*-81*	457.5	30	160
28	942.5	20	20	140		10	150	30	92	0	-92	*0*	549.5	40	180
29	1103.5	20	20	142		150	30	40	0	38	38	*59*	568.5	20	70
30	1274.5	20	20	152		68	40	20	0	48	48	*79*	592.5	10	60
31	1353.5	20	20	60		88	20	10	0	68	68	*119*	626.5	0	30
32	1432.5	10	20	60		88	10	0	0	68	68	*110*	660.5	0	10
33	1501.5	0	10	50		78	0	0	0	58	58	*100*	689.5	0	0
34	1555.5	0	0	30		58	0	0	0	48	48	*90*	713.5	0	0
35	1609.5	0	0	10		48	0	0	0	48	48	*80*	737.5	0	0
36	1673.5	0	0	0		48	0	0	0	48	48	*80*	761.5	0	0
37	1757.5	0	0	0		48	0	0	0	48	48	*80*	785.5	0	0
38	1851.5	0	0	0		48	0	0	0	48	48	*80*	809.5	0	0
39	1950.5	0	0	0		48	0	0	0	48	48	*80*	833.5	0	0
40	2054.5	5	0	0		48	0	0	0	48	48	*80*	857.5	0	0

NORTH EAST GAME MODEL WEEKS 21 TO 40 MODEL DATA

NORTH EAST								
NO IT								
Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	4	12	4	12	4	12	8	12
4	4	12	4	12	4	12	4	12
5	8	8	4	12	4	12	8	8
6	8	4	4	12	4	12	4	12
7	12	0	4	8	4	12	0	12
8	16	-4	8	0	5	11	4	15
9	8	-4	8	-15	8	10	0	11
10	8	-4	12	-3	5	3	15	3
11	8	0	12	-12	8	-1	15	-5
12	8	-2	15	0	8	-1	50	-12
13	10	-2	10	4	10	2	10	0
14	8	-2	5	7	10	4	10	5
15	8	-2	9	6	10	1	0	50
16	10	-2	0	1	4	11	0	56
17	10	-10	0	-3	4	16	0	66
18	11	-8	15	-11	0	-4	0	66
19	19	-11	10	-22	0	-9	0	66
20	27	-19	10	-28	0	-15	0	61
21	31	-27	10	-20	5	-25	0	53
22	28	-31	30	-29	8	-30	2	43
23	18	-28	90	-55	10	-32	2	35
24	24	-18	30	-71	20	-52	5	25
25	25	-24	20	-91	90	-107	10	6
26	25	-25	10	-101	30	-17	150	-91
27	23	-25	10	-117	20	13	30	-81
28	23	-23	20	-122	20	8	40	0
29	21	-23	20	-132	20	11	20	59
30	14	-21	20	-141	20	-5	10	79
31	8	-14	10	-159	20	-5	0	119
32	11	-8	5	-49	10	5	0	110
33	0	-11	20	-53	0	-5	0	100
34	0	2	20	-56	0	10	0	90
35	0	114	20	-62	0	30	0	80
36	0	111	10	-52	0	30	0	80
37	0	108	5	-52	0	30	0	80
38	0	110	5	-32	0	20	0	80
39	0	102	5	-22	0	15	0	80
40	0	114	0	-12	5	10	0	80

ROOT 66 GAME MODEL WEEKS 21 TO 40

RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	-1.610887	0	4	16	12	12	12
2	4	1.25	4	-1.954247	0	4	16	12	12	12
3	4	2.11	6	0.866807	2.655014	3.3449856	11.1899287	12	12	12
4	4	2.70	4	-0.280346	1.962239	2.0377613	4.15247114	12	12	14
5	8	3.10	7	-1.064004	3.400514	3.5994865	12.9563028	8	8	14
6	8	4.63	10	-1.673102	5.930308	4.0696922	16.5623946	4	4	17
7	8	5.68	10	-0.252715	9.036792	0.9632083	0.92777032	2	2	21
8	8	6.41	14	-0.050255	10.46096	3.5390437	12.5248302	-2	0	27
9	8	6.90	14	0.18434	10.71565	3.2843549	10.7869871	-3	0	34
10	8	7.25	14	-1.730213	9.870513	5.1294869	26.311636	-1	0	38
11	8	7.48	10	0.037485	10.14696	-0.146961	0.02159767	1	1	42
12	8	7.64	10	1.561178	10.9248	-0.924801	0.85525609	3	3	42
13	8	7.75	14	-0.181181	9.948862	4.0511376	16.4117162	1	1	46
14	8	7.83	20	1.899798	12.06306	7.9369445	62.9950882	0	0	53
15	8	7.88	14	0.728857	9.355199	4.6448014	21.5741796	2	2	63
16	8	7.92	14	-0.017964	8.621228	5.3787716	28.9311837	1	1	70
17	8	7.95	12	0.957065	8.440686	3.5593135	12.6687128	3	3	74
18	8	7.96	12	-0.404998	7.208743	4.7912573	22.9561468	2	2	79
19	8	7.97	10	-1.610887	5.741917	4.2580831	18.1312714	2	2	83
20	8	7.98	10	-1.954247	5.270307	4.7296935	22.3700002	2	2	85
21	8	7.99	8	1.890076	8.212442	-0.212442	0.04513156	4	4	85
22	8	7.99	6	2.348575	5.58917	0.4108305	0.16878169	12	12	77
23	8	7.99	1	-1.44992	0	1	1	18	18	69
24	8	8.00	1	-1.799915	0	1	1	22	22	58
25	8	8.00	1	0.255976	0	1	1	34	34	39
26	8	8.00	1	-1.531558	0	1	1	52	52	14
27	8	8.00	1	-0.933802	0	1	1	56	56	3
28	8	8.00	1	1.890076	0	1	1	49	49	3
29	8	8.00	1	2.348575	0	1	1	42	42	3
30	8	8.00	1	-1.44992	0	1	1	35	35	3
31	8	8.00	1	1.770105	2.8024	-1.8024	3.24864896	28	28	3
32	8	8.00	4	-1.178587	3.031029	0.9689713	0.93890533	21	21	3
33	8	8.00	8	-0.707772	6.47454	1.5254595	2.32702682	14	14	6
34	8	8.00	10	-0.340979	9.541288	0.4587118	0.21041648	7	7	13
35	8	8.00	10	-0.429372	12.01647	-2.016467	4.06813726	0	0	22
36	9	8.00	12	-0.699718	11.33703	0.6629707	0.43953019	-4	0	28
37	10	8.31	12	-0.605672	11.47043	0.5295669	0.28044107	-4	0	32
38	11	8.84	12	0.171977	12.6385	-0.638495	0.40767639	-2	0	34
39	12	9.51	12	-0.736438	12.26818	-0.268177	0.07191883	0	0	36
40	13	10.29	12	-0.35483	11.6103	0.3897027	0.1518682	4	4	36
	mean of the disturbance			-0.167084		2.2738835	mean of the standard errors			
	std dev of the disturbance			1.34623						

Σ (AO-Ot)2	20.35648		constraints	
θ	0.31		>=0	<=1
αs	0.45		>=0	<=1
β	0.15		>=0	<=1
S'	13.10		>=0	<=100

GRG NonLinear

Incoming Orders:

IO = COR

Expected Incoming Orders:

$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:

AO = ROP

Disturbance:

normally distributed white noise

mean = 0

std dev = 1

Model Orders:

$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$

Error Term:

$AO - O_t$

Squared errors:

$(AO - O_t)^2$

Effective Inventory:

EI = REI

Stock:

St = MAX(0,EI)

Supply Line:

SLt = RSL = RSD1+RSD2+WIO+WBL

ROOT 66 GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	-1.188135	1.557211	2.4427887	5.96721681	12	12	12
2	4	4	4	0.95234	3.697687	0.3023134	0.0913934	12	12	12
3	4	4	9	-1.275006	1.470341	7.5296595	56.6957717	12	12	12
4	6	4	7	-1.164377	1.5144	5.4855999	30.0918066	12	12	17
5	4	6	6	0.039745	4.98412	1.0158802	1.03201266	10	10	20
6	7	4	5	0.12052	3.038267	1.961733	3.84839644	10	10	22
7	10	7	6	-1.20639	4.459073	1.5409271	2.37445624	12	12	18
8	10	10	7	-1.188135	7.948951	-0.948951	0.90050805	9	9	17
9	14	10	10	0.95234	10.68719	-0.687192	0.47223227	5	5	18
10	14	14	7	-1.275006	13.15712	-6.157125	37.9101865	-4	0	23
11	14	14	10	-0.412082	14.00673	-4.006735	16.0539231	-12	0	24
12	10	14	16	-0.477775	13.9011	2.0989004	4.4053829	-19	0	27
13	10	10	12	-0.184498	10.1145	1.8854966	3.55509726	-19	0	33
14	14	10	14	2.495689	12.72811	1.2718889	1.61770142	-22	0	38
15	20	14	14	0.837797	15.01696	-1.016963	1.03421341	-26	0	42
16	14	20	25	-0.853678	19.23229	5.7677094	33.2664716	-39	0	49
17	14	14	20	-0.483989	13.37564	6.6243571	43.8821076	-45	0	66
18	12	14	15	-1.412241	12.28762	2.7123763	7.35698546	-51	0	78
19	12	12	15	0.563318	12.19661	2.8033864	7.85897508	-53	0	83
20	10	12	15	-1.055571	10.59104	4.4089619	19.4389447	-49	0	82
21	10	10	14	-0.164309	9.468987	4.5310132	20.5300807	-45	0	83
22	8	10	10	-0.501262	9.105406	0.8945942	0.80029878	-43	0	85
23	6	8	4	-0.434084	7.305723	-3.305723	10.9278041	-31	0	75
24	1	6	0	0.795478	6.828191	-6.828191	46.624198	-11	0	53
25	1	1	2	1.382518	0	2	4	27	27	14
26	1	1	2	0.606916	0	2	4	36	36	6
27	1	1	2	0.324617	0	2	4	39	39	4
28	1	1	1	-2.067121	0	1	1	38	38	6
29	1	1	1	0.079654	0	1	1	39	39	5
30	1	1	2	-0.523112	0	2	4	40	40	4
31	1	1	0	0.130014	0	0	0	41	41	4
32	1	1	1	-0.24794	0	1	1	41	41	3
33	4	1	0	-1.354976	0	0	0	41	41	3
34	8	4	1	-1.058522	0	1	1	39	39	1
35	10	8	4	-0.658089	3.31779	0.6822098	0.46541022	31	31	2
36	10	10	6	-0.459557	6.851289	-0.851289	0.72469312	22	22	5
37	12	10	10	1.442729	10.20139	-0.201389	0.04055744	12	12	11
38	12	12	12	-0.31631	12.00299	-0.002992	8.9531E-06	1	1	20
39	12	12	14	-0.874573	11.49099	2.5090117	6.29513965	-7	0	28
40	12	12	14	-0.831855	11.42719	2.572805	6.61932559	-13	0	36
	mean of the disturbance			-0.283009		1.2288262	mean of the standard errors			
	std dev of the disturbance			0.957468						

Σ (AO-Ot)2	113.0275		constraints	
θ	1.00		>=0	<=1
αs	0.15		>=0	<=1
β	0.09		>=0	<=1
S'	4.83		>=0	<=100

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

ROOT 66 GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	2.000138	4	-2.052494	0	4	16	12	12	12
2	4	3.000138	4	-0.052044	0	4	16	12	12	12
3	4	3.500104	6	1.842802	0	6	36	12	12	12
4	9	3.750069	6	-0.185838	0	6	36	12	12	14
5	7	6.375216	6	-1.266806	3.839966	2.1600345	4.66574899	7	7	16
6	6	6.68763	8	-1.284787	7.134399	0.8656014	0.74926574	4	4	18
7	5	6.343791	6	-1.83881	6.236536	-0.236536	0.0559494	4	4	20
8	6	5.671849	8	-0.363776	6.039629	1.9603709	3.84305392	5	5	20
9	7	5.835936	8	-0.919656	5.647836	2.3521642	5.53267641	5	5	22
10	10	6.418008	6	1.036761	7.186325	-1.186325	1.40736668	6	6	22
11	7	8.209128	8	0.059907	12.00059	-4.000591	16.0047279	2	2	22
12	10	7.604522	8	1.283963	11.62004	-3.620041	13.1046934	3	3	22
13	16	8.802344	10	0.520896	14.0548	-4.054796	16.4413679	1	1	22
14	12	12.40142	16	1.250691	19.38367	-3.383668	11.4492071	-9	0	26
15	14	12.2007	16	-0.547812	17.38444	-1.38444	1.91667366	-13	0	34
16	14	13.10041	25	0.692173	19.52414	5.4758606	29.9850495	-19	0	42
17	25	13.55024	25	0.368677	19.65047	5.3495311	28.6174826	-23	0	57
18	20	19.27551	40	-0.680633	24.32644	15.673563	245.66059	-32	0	66
19	15	19.63778	50	-2.052494	23.31684	26.683156	711.990837	-38	0	92
20	15	17.31873	50	-0.052044	22.98824	27.011758	729.635058	-41	0	130
21	15	16.15929	30	-0.741409	21.14943	8.8505683	78.3325599	-36	0	160
22	14	15.5796	20	-0.691067	20.62009	-0.620091	0.38451309	-25	0	164
23	10	14.78975	10	-1.29074	18.23056	-8.230562	67.7421511	1	1	144
24	4	12.39471	0	-0.117588	0	0	0	51	51	94
25	0	8.197064	0	0.891727	0	0	0	111	111	30
26	2	4.098248	0	0.537454	0	0	0	131	131	10
27	2	3.049052	0	-1.612334	0	0	0	139	139	0
28	2	2.52449	0	-0.605893	0	0	0	137	137	0
29	1	2.262227	0	-1.093281	0	0	0	135	135	0
30	1	1.63107	0	2.312751	0	0	0	134	134	0
31	2	1.315513	0	0.227392	0	0	0	133	133	0
32	0	1.65778	0	0.646086	0	0	0	131	131	0
33	1	0.828833	0	1.322044	0	0	0	131	131	0
34	0	0.914422	0	-0.273784	0	0	0	130	130	0
35	1	0.45718	0	-0.505519	0	0	0	130	130	0
36	4	0.728609	0	-0.071921	0	0	0	129	129	0
37	6	2.364417	0	1.059075	0	0	0	125	125	0
38	10	4.182334	0	-0.242596	0	0	0	119	119	0
39	12	7.091368	0	1.529252	0	0	0	109	109	0
40	14	9.545854	0	-0.741409	0	0	0	97	97	0
	mean of the disturbance			-0.150157		2.5618731	mean of the standard errors			
	std dev of the disturbance			1.091136						

Σ (AO-Ot)2	146.4592		constraints	
θ	0.50		>=0	<=1
αs	1.00		>=0	<=1
β	0.00		>=0	<=1
S'	5.73		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

ROOT 66 GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

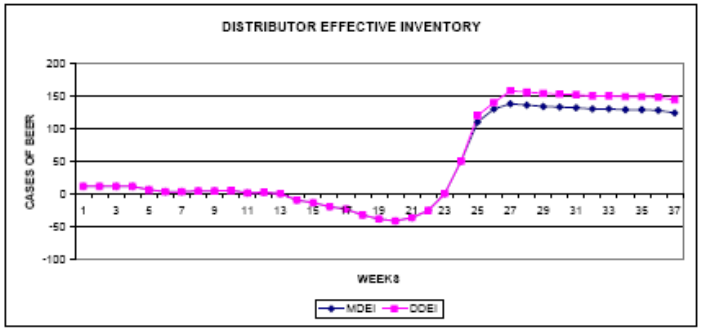
FACTOR	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	1.09754	93.09754	-89.09754	7938.37165	12	12	8
2	4	4	4	-0.242131	91.75787	-87.75787	7701.44361	12	12	8
3	4	4	4	0.313691	92.31369	-88.31369	7799.30808	12	12	8
4	6	4	4	-1.148476	90.85152	-86.85152	7543.18721	12	12	8
5	6	6	4	1.132208	97.13221	-93.13221	8673.60814	10	10	8
6	6	6	6	-1.642091	96.35791	-90.35791	8164.55178	8	8	8
7	8	6	8	0.191667	100.1917	-92.19167	8499.30351	6	6	10
8	6	8	6	-0.983063	105.0169	-99.01694	9804.35375	2	2	14
9	8	6	8	-1.600161	102.3998	-94.39984	8911.32963	2	2	14
10	8	8	8	-2.806946	103.1931	-95.19305	9061.71748	2	2	14
11	6	8	10	-0.096509	107.9035	-97.90349	9585.09347	0	0	16
12	8	6	12	-0.962753	103.0372	-91.03725	8287.78041	2	2	18
13	8	8	10	-0.288896	105.7111	-95.7111	9160.61546	2	2	22
14	10	8	14	0.711103	104.7111	-90.7111	8228.50419	4	4	22
15	16	10	12	1.21352	105.2135	-93.21352	8688.76025	6	6	24
16	16	16	20	0.143477	116.1435	-96.14348	9243.56815	0	0	26
17	25	16	26	-0.556603	115.4434	-89.4434	8000.12123	-2	0	32
18	25	25	40	0.006687	125.0067	-85.00669	7226.13681	-15	0	46
19	40	25	60	1.09754	126.0975	-66.09754	4368.88481	-20	0	66
20	50	40	100	-0.242131	139.7579	-39.75787	1580.68817	-34	0	100
21	50	50	250	-0.453539	149.5465	100.45354	10090.9135	-44	0	160
22	30	50	250	-0.664231	149.3358	100.66423	10133.2875	-34	0	350
23	20	30	100	0.693115	94.69312	5.3068846	28.1630246	36	36	500
24	10	20	0	-0.779926	0	0	0	266	266	350
25	0	10	0	0.327863	0	0	0	506	506	100
26	0	0	0	-0.029088	0	0	0	606	606	0
27	0	0	0	0.340095	0	0	0	606	606	0
28	0	0	0	1.081271	0	0	0	606	606	0
29	0	0	0	0.54576	0	0	0	606	606	0
30	0	0	0	-0.636845	0	0	0	606	606	0
31	0	0	0	0.477795	0	0	0	606	606	0
32	0	0	0	-0.885949	0	0	0	606	606	0
33	0	0	0	-0.647516	0	0	0	606	606	0
34	0	0	0	-0.406482	0	0	0	606	606	0
35	0	0	0	1.081271	0	0	0	606	606	0
36	0	0	0	0.54576	0	0	0	606	606	0
37	0	0	0	-0.636845	0	0	0	606	606	0
38	0	0	0	0.477795	0	0	0	606	606	0
39	0	0	0	-0.885949	0	0	0	606	606	0
40	0	0	0	-0.647516	0	0	0	606	606	0
	mean of the disturbance			-0.131964		-44.42609	mean of the standard errors			
	std dev of the disturbance			0.918482						

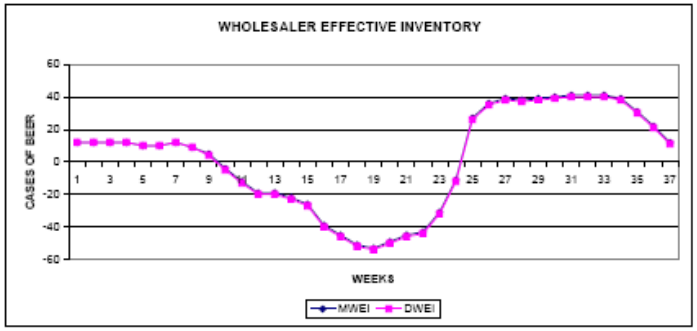
Σ (AO-Ot)2	20252.36		constraints		
θ	1.00		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.00		>=0	<=1	
S'	100.00		>=0	<=100	
	GRG NonLinear				

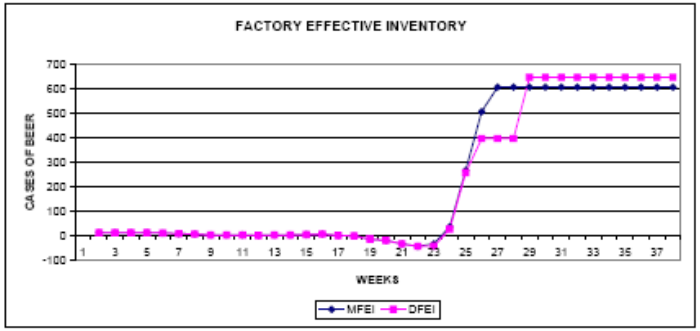
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

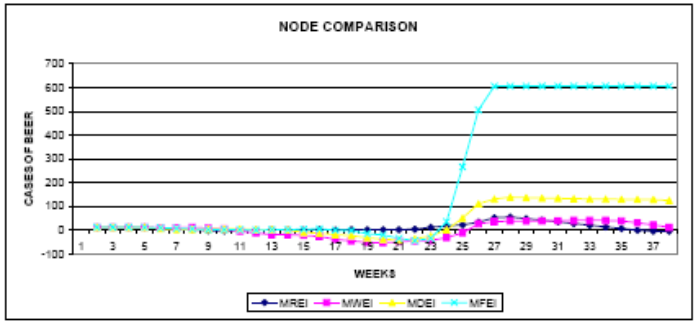
ROOT 66 GAME MODEL WEEKS 21 TO 40

MODEL CHARTS

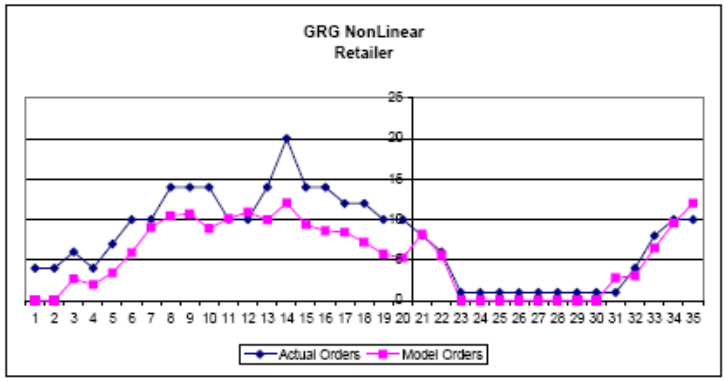


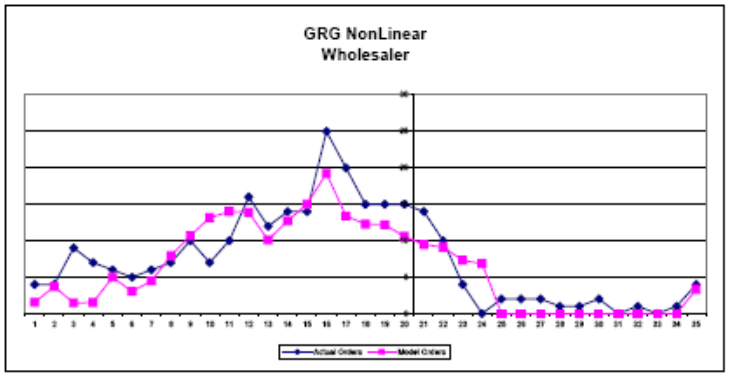


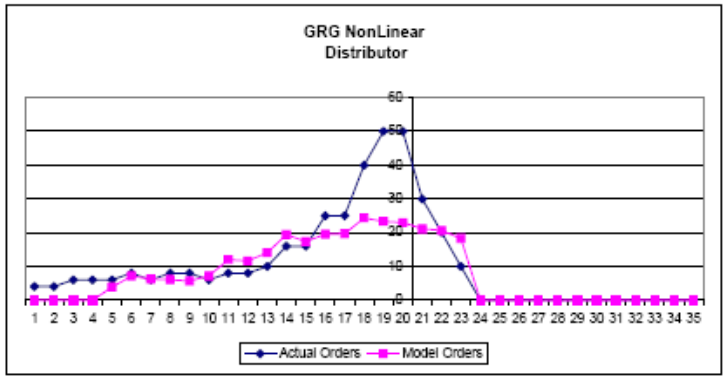


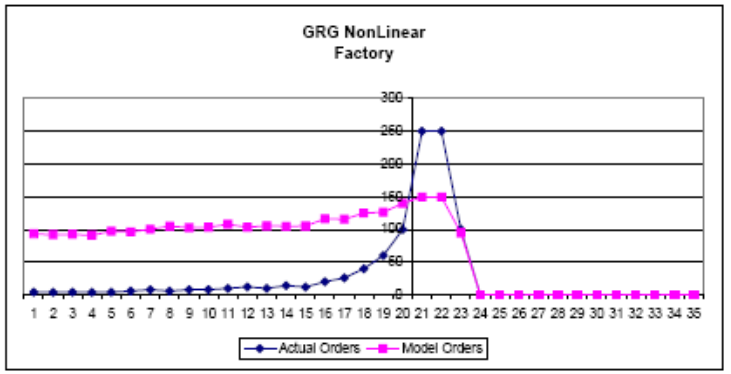


ROOT 66 GAME MODEL WEEKS 21 TO 40 ORDER CHARTS









ROOT 66 GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	ROOT 66	NO IT							ROOT 66	Retailer	NO IT					
	Team Costs	$ 7,473.00							Costs	$ 254.50						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	4	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	6	4	12		16	4
4	4	16	4	4	0	4	12	12	*12*	24	4	6	14		16	4
5	8	16	4	6	0	8	8	8	*8*	28	7	4	14		16	4
6	8	12	6	4	0	8	4	4	*4*	30	10	7	17		14	9
7	8	10	4	7	0	8	2	2	*2*	31	10	10	21		19	7
8	8	6	7	10	2	6	0	-2	*-2*	33	14	10	27		19	6
9	8	7	10	10	3	7	0	-3	*-3*	36	14	14	34		15	5
10	8	10	10	10	1	10	0	-1	*-1*	37	14	14	38		10	6
11	8	10	10	6	0	9	1	1	*2*	37.5	10	14	42		6	7
12	8	11	6	7	0	8	3	3	*3*	39	10	10	42		7	10
13	8	9	7	10	0	8	1	1	*1*	39.5	14	10	46		10	7
14	8	8	10	7	0	8	0	0	*0*	39.5	20	14	53		7	10
15	8	10	7	10	0	8	2	2	*2*	40.5	14	20	63		10	7
16	8	9	10	7	0	8	1	1	*1*	41	14	14	70		7	8
17	8	11	7	8	0	8	3	3	*3*	42.5	12	14	74		8	8
18	8	10	8	8	0	8	2	2	*2*	43.5	12	12	79		8	10
19	8	10	8	10	0	8	2	2	*2*	44.5	10	12	83		10	16
20	8	10	10	16	0	8	2	2	*2*	45.5	10	10	85		16	14
21	8	12	16	14	0	8	4	4	*4*	47.5	8	10	85		14	12
22	8	20	14	12	0	8	12	12	*12*	53.5	6	8	77		12	20
23	8	26	12	20	0	8	18	18	*18*	62.5	1	6	69		20	26
24	8	30	20	26	0	8	22	22	*22*	73.5	1	1	58		26	39
25	8	42	26	12	0	8	34	34	*34*	90.5	1	1	39		39	10
26	8	60	12	1	0	8	52	52	*52*	116.5	1	1	14		37	4
27	8	64	1	1	0	8	56	56	*57*	144.5	1	1	3		40	0
28	8	57	1	1	0	8	49	49	*50*	169	1	1	3		39	2
29	8	50	1	1	0	8	42	42	*43*	190	1	1	3		40	2
30	8	43	1	1	0	8	35	35	*37*	207.5	1	1	3		41	2
31	8	36	1	1	0	8	28	28	*29*	221.5	1	1	3		42	1
32	8	29	1	1	0	8	21	21	*22*	232	4	1	3		42	1
33	8	22	1	1	0	8	14	14	*15*	239	8	4	6		42	2
34	8	15	1	4	0	8	7	7	*8*	242.5	10	8	13		43	0
35	8	8	4	8	0	8	0	0	*1*	242.5	10	10	22		39	1
36	8	4	8	10	4	4	0	-4	*-3*	246.5	12	10	28		32	0
37	8	8	10	10	4	8	0	-4	*-3*	250.5	12	12	32		22	1
38	8	10	10	12	2	10	0	-2	*-1*	252.5	12	12	34		13	4
39	8	10	12	5	0	10	0	0	*1*	252.5	12	12	36		5	6
40	8	12	5	6	0	8	4	4	*5*	254.5	12	12	36		6	10

ROOT 66 GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

	STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews						
					ROOT 66 Costs	Wholesaler $ 759.50		NO IT									ROOT 66 Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	4	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	9	4	12		16	4	4	0	12	12	*12*
4	4	0	12	12	*12*	24	7	9	17		16	4	4	0	12	12	*12*
5	9	0	10	10	*10*	29	6	7	20		16	4	6	0	7	7	*7*
6	7	0	10	10	*10*	34	5	6	22		11	6	6	0	4	4	*4*
7	6	0	12	12	*12*	40	6	5	18		10	6	6	0	4	4	*4*
8	5	0	9	9	*9*	44.5	7	6	17		10	6	8	0	5	5	*5*
9	6	0	5	5	*4*	47	10	7	18		11	8	6	0	5	5	*5*
10	7	4	0	-4	*-5*	51	7	10	23		13	6	8	0	6	6	*6*
11	10	12	0	-12	*-13*	63	10	7	24		12	8	8	0	2	2	*2*
12	7	19	0	-19	*-20*	82	16	10	27		10	8	6	0	3	3	*3*
13	10	19	0	-19	*-20*	101	12	16	33		11	6	8	0	1	1	*1*
14	7	22	0	-22	*-23*	123	14	12	38		7	8	8	9	0	-9	*-9*
15	8	26	0	-26	*-27*	149	14	14	42		8	8	10	13	0	-13	*-13*
16	8	39	0	-39	*-40*	188	25	14	49		8	10	16	19	0	-19	*-19*
17	10	45	0	-45	*-46*	233	20	25	66		10	16	14	23	0	-23	*-23*
18	16	51	0	-51	*-52*	284	15	20	78		16	14	12	32	0	-32	*-32*
19	14	53	0	-53	*-54*	337	15	15	83		14	12	20	38	0	-38	*-38*
20	12	49	0	-49	*-50*	386	15	15	82		12	20	26	41	0	-41	*-41*
21	20	45	0	-45	*-46*	431	14	15	83		20	26	40	36	0	-36	*-36*
22	26	43	0	-43	*-44*	474	10	14	85		26	40	60	25	0	-25	*-25*
23	39	31	0	-31	*-32*	505	4	10	75		40	60	64	0	1	1	*1*
24	10	11	0	-11	*-12*	516	0	4	53		61	64	20	0	51	51	*51*
25	4	0	27	27	*26*	529.5	2	0	14		115	20	10	0	111	111	*121*
26	0	0	36	36	*35*	547.5	2	2	6		131	10	0	0	131	131	*141*
27	2	0	39	39	*38*	567	2	2	4		141	0	0	0	139	139	*159*
28	2	0	38	38	*37*	586	1	2	6		139	0	0	0	137	137	*157*
29	2	0	39	39	*38*	605.5	1	1	5		137	0	0	0	135	135	*155*
30	1	0	40	40	*39*	625.5	2	1	4		135	0	0	0	134	134	*154*
31	1	0	41	41	*40*	646	0	2	4		134	0	0	0	133	133	*153*
32	2	0	41	41	*40*	666.5	1	0	3		133	0	0	0	131	131	*151*
33	0	0	41	41	*40*	687	0	1	3		131	0	0	0	131	131	*151*
34	1	0	39	39	*38*	706.5	1	0	1		131	0	0	0	130	130	*150*
35	0	0	31	31	*30*	722	4	1	2		130	0	0	0	130	130	*150*
36	1	0	22	22	*21*	733	6	4	5		130	0	0	0	129	129	*149*
37	4	0	12	12	*11*	739	10	6	11		129	0	0	0	125	125	*145*
38	6	0	1	1	*0*	739.5	12	10	20		125	0	0	0	119	119	*139*
39	10	7	0	-7	*-8*	746.5	14	12	28		119	0	0	0	109	109	*129*
40	12	13	0	-13	*-14*	759.5	14	14	36		109	0	0	0	97	97	*117*

ROOT 66 GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		NO IT									ROOT 66	Factory	NO IT		
	$ 1,315.00											Costs	$ 5,144.00			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	*12*	12	4	8	
3	18	6	4	12		16	4	4	0	12	12	*12*	18	4	8	
4	24	6	6	14		16	4	4	0	12	12	*12*	24	4	8	
5	27.5	6	6	16		16	4	4	0	10	10	*10*	29	4	8	
6	29.5	8	6	18		14	4	4	0	8	8	*8*	33	6	8	
7	31.5	6	8	20		12	4	6	0	6	6	*6*	36	8	10	
8	34	8	6	20		10	6	8	0	2	2	*2*	37	6	14	
9	36.5	8	8	22		8	8	6	0	2	2	*2*	38	8	14	
10	39.5	6	8	22		10	6	8	0	2	2	*2*	39	8	14	
11	40.5	8	6	22		8	8	8	0	0	0	*0*	39	10	16	
12	42	8	8	22		8	8	10	0	2	2	*2*	40	12	18	
13	42.5	10	8	22		10	10	12	0	2	2	*2*	41	10	22	
14	51.5	16	10	28		12	12	10	0	4	4	*4*	43	14	22	
15	64.5	16	16	34		16	10	14	0	6	6	*6*	46	12	24	
16	83.5	25	16	42		16	14	12	0	0	0	*0*	46	20	26	
17	106.5	25	25	57		14	12	20	2	0	-2	*-2*	48	26	32	
18	138.5	40	25	66		12	20	26	15	0	-15	*-15*	63	40	46	
19	176.5	50	40	92		20	26	40	20	0	-20	*-20*	83	60	66	
20	217.5	50	50	130		26	40	60	34	0	-34	*-34*	117	100	100	
21	253.5	30	50	160		40	60	100	44	0	-44	*-44*	161	250	160	
22	278.5	20	30	164		60	100	250	34	0	-34	*-44*	195	250	350	
23	279	10	20	144		100	250	250	0	36	36	*26*	213	100	500	
24	304.5	0	10	94		286	250	100	0	286	286	*256*	346	0	350	
25	360	0	0	30		516	100	0	0	506	506	*396*	599	0	100	
26	425.5	0	0	10		606	0	0	0	606	606	*396*	902	0	0	
27	495	0	0	0		606	0	0	0	606	606	*396*	1205	0	0	
28	563.5	0	0	0		606	0	0	0	606	606	*646*	1508	0	0	
29	631	0	0	0		606	0	0	0	606	606	*646*	1811	0	0	
30	698	0	0	0		606	0	0	0	606	606	*646*	2114	0	0	
31	764.5	0	0	0		606	0	0	0	606	606	*646*	2417	0	0	
32	830	0	0	0		606	0	0	0	606	606	*646*	2720	0	0	
33	895.5	0	0	0		606	0	0	0	606	606	*646*	3023	0	0	
34	960.5	0	0	0		606	0	0	0	606	606	*646*	3326	0	0	
35	1025.5	0	0	0		606	0	0	0	606	606	*646*	3629	0	0	
36	1090	0	0	0		606	0	0	0	606	606	*646*	3932	0	0	
37	1152.5	0	0	0		606	0	0	0	606	606	*646*	4235	0	0	
38	1212	0	0	0		606	0	0	0	606	606	*646*	4539	0	0	
39	1266.5	0	0	0		606	0	0	0	606	606	*646*	4841	0	0	
40	1315	0	0	0		606	0	0	0	606	606	*646*	5144	0	0	

ROOT 66 GAME MODEL WEEKS 21 TO 40 MODEL DATA

ROOT 66 NO IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	6	12	9	12	6	12	4	12
4	4	12	7	12	6	12	4	12
5	7	8	6	10	6	7	4	10
6	10	4	5	10	8	4	6	8
7	10	2	6	12	6	4	8	6
8	14	-2	7	9	8	5	6	2
9	14	-3	10	4	8	5	8	2
10	14	-1	7	-5	6	6	8	2
11	10	2	10	-13	8	2	10	0
12	10	3	16	-20	8	3	12	2
13	14	1	12	-20	10	1	10	2
14	20	0	14	-23	16	-9	14	4
15	14	2	14	-27	16	-13	12	6
16	14	1	25	-40	25	-19	20	0
17	12	3	20	-46	25	-23	26	-2
18	12	2	15	-52	40	-32	40	-15
19	10	2	15	-54	50	-38	60	-20
20	10	2	15	-50	50	-41	100	-34
21	8	4	14	-46	30	-36	250	-44
22	6	12	10	-44	20	-25	250	-44
23	1	18	4	-32	10	1	100	26
24	1	22	0	-12	0	51	0	256
25	1	34	2	26	0	121	0	396
26	1	52	2	35	0	141	0	396
27	1	57	2	38	0	159	0	396
28	1	50	1	37	0	157	0	646
29	1	43	1	38	0	155	0	646
30	1	37	2	39	0	154	0	646
31	1	29	0	40	0	153	0	646
32	4	22	1	40	0	151	0	646
33	8	15	0	40	0	151	0	646
34	10	8	1	38	0	150	0	646
35	10	1	4	30	0	150	0	646
36	12	-3	6	21	0	149	0	646
37	12	-3	10	11	0	145	0	646
38	12	-1	12	0	0	139	0	646
39	12	1	14	-8	0	129	0	646
40	12	5	14	-14	0	117	0	646

SHINER GAME MODEL WEEKS 21 TO 40 RME GRG NonLinear

RETAILE	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	0	0								
1	4	0.00	4	0.078262	6.864151	-2.864151	8.20335984	12	12	12
2	4	0.00	6	1.340195	8.126084	-2.126084	4.52023254	12	12	12
3	4	0.00	8	-0.604007	6.012981	1.987019	3.94824453	12	12	14
4	4	0.00	6	-0.253966	6.025222	-0.025222	0.00063617	12	12	18
5	8	0.00	8	-0.500804	8.058965	-0.058965	0.00347686	8	8	20
6	8	0.00	8	0.291431	9.90704	-1.90704	3.6368011	6	6	22
7	8	0.00	8	-1.286554	8.329055	-0.329055	0.10827694	6	6	22
8	8	0.00	8	0.653583	11.32503	-3.325033	11.0558423	4	4	24
9	8	0.00	6	-1.05685	9.614599	-3.614599	13.0653272	4	4	24
10	8	0.00	8	1.335428	12.7037	-4.703698	22.1247729	3	3	23
11	8	0.00	10	-0.203603	12.22051	-2.220507	4.93086318	1	1	25
12	8	0.00	12	-2.686267	10.01241	1.9875876	3.95050435	-1	0	29
13	8	0.00	10	0.68402	12.62265	-2.62265	6.87829113	-6	0	38
14	8	0.00	18	-0.644079	10.78785	7.2121498	52.0151054	-10	0	44
15	8	0.00	14	-0.03019	10.21944	3.7805625	14.2926527	-14	0	58
16	8	0.00	20	-0.680718	9.40001	10.59999	112.359785	-10	0	60
17	8	0.00	12	-1.421612	7.645715	4.3542848	18.9597981	-10	0	72
18	8	0.00	12	-0.060493	8.669034	3.330966	11.0953343	-10	0	76
19	8	0.00	12	0.81951	9.211236	2.7887639	7.7772039	-10	0	80
20	8	0.00	12	1.150882	9.542608	2.4573917	6.03877387	-6	0	80
21	8	0.00	12	1.869443	10.26117	1.7388308	3.02353241	-2	0	80
22	8	0.00	12	-0.302893	5.280333	6.7196671	45.1539261	5	5	77
23	8	0.00	4	1.170693	8.527699	-4.527699	20.5000601	1	1	85
24	8	0.00	10	-0.09441	6.016736	3.9832638	15.8663905	4	4	78
25	8	0.00	0	-0.098303	3.732262	-3.732262	13.9297828	8	8	76
26	8	0.00	0	-0.687696	0.143029	-0.143029	0.02045723	15	15	61
27	8	0.00	4	-1.305811	0	4	16	37	37	31
28	8	0.00	0	2.279347	0	0	0	60	60	4
29	8	0.00	0	0.281298	0	0	0	52	52	4
30	8	0.00	0	-0.355587	0	0	0	44	44	4
31	8	0.00	0	-0.446304	0	0	0	40	40	0
32	8	0.00	2	-1.136902	0	2	4	32	32	0
33	8	0.00	2	1.850961	2.132907	-0.132907	0.01766432	24	24	2
34	8	0.00	4	-0.502138	4.509871	-0.509871	0.25996795	16	16	4
35	8	0.00	8	-1.49503	8.07914	-0.07914	0.00610579	8	8	8
36	9	0.00	20	0.831431	13.57212	6.4278785	41.317622	2	2	14
37	10	0.00	12	-0.672823	11.77251	0.2274938	0.05175344	-4	0	32
38	11	0.00	12	-0.043498	11.72623	0.2737685	0.07494919	-8	0	40
39	12	0.00	4	-0.63611	10.79582	-6.795819	46.1831542	-8	0	44
40	13	0.00	8	1.122312	11.45596	-3.455961	11.9436694	4	4	28
	mean of the disturbance			-0.057979		0.6862733	mean of the standard errors			
	std dev of the disturbance			1.084517						

Σ (AO-Ot)2	218.349		constraints	
θ	0.00		>=0	<=1
αs	0.61		>=0	<=1
β	0.14		>=0	<=1
S'	24.74		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = COR
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = ROP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = REI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = RSL = RSD1+RSD2+WIO+WBL

SHINER GAME MODEL WEEKS 21 TO 40 WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	2.3837	4	1.063869	4.893318	-0.893318	0.79801666	12	12	12
2	4	3.346893	5	1.775287	6.567929	-1.567929	2.45840271	12	12	12
3	6	3.736096	5	-0.121044	5.060801	-0.060801	0.00369681	12	12	13
4	8	5.085213	5	-1.709443	4.899632	0.1003679	0.01007371	10	10	14
5	6	6.822207	6	-0.165393	8.336901	-2.336901	5.4611053	6	6	15
6	8	6.332233	6	1.319604	9.370981	-3.370981	11.3635136	5	5	16
7	8	7.326097	7	-1.965114	7.197295	-0.197295	0.0389253	2	2	17
8	8	7.727693	7	2.565331	12.20745	-5.207449	27.1175217	-1	0	19
9	8	7.889967	10	-0.669094	9.135298	0.864702	0.74770947	-3	0	20
10	6	7.955539	7	1.080195	10.95016	-3.950158	15.6037504	-5	0	24
11	8	6.790184	13	-1.78272	6.921889	6.0781106	36.943429	-8	0	28
12	10	7.511144	10	-0.722067	8.703502	1.2964983	1.6809079	-12	0	37
13	12	8.994315	13	1.148218	12.05696	0.943042	0.88932823	-18	0	43
14	10	10.78548	20	1.386411	14.08631	5.9136872	34.9716968	-18	0	44
15	18	10.31739	30	-0.685502	11.54631	18.453686	340.538518	-20	0	56
16	14	14.89565	35	1.008955	17.81703	17.182971	295.264507	-30	0	78
17	20	14.36191	40	-1.330556	14.94578	25.054222	627.714036	-36	0	105
18	12	17.72179	25	0.098264	19.73448	5.2655234	27.7257367	-44	0	133
19	12	14.31203	20	-0.722067	15.50439	4.4956099	20.2105083	-44	0	146
20	12	12.93423	15	1.148218	15.99688	-0.996877	0.99376467	-41	0	151
21	12	12.3775	20	-0.121292	14.17063	5.829366	33.9815077	-49	0	162
22	12	12.15254	15	-1.074958	12.99201	2.0079947	4.03204256	-50	0	171
23	12	12.08164	10	0.50084	14.4767	-4.476702	20.0408599	-50	0	174
24	4	12.02491	15	-0.632421	13.30691	1.6930904	2.8665552	-47	0	169
25	10	7.242665	10	-0.676141	8.480948	1.5190516	2.30751789	-21	0	154
26	0	8.885829	0	-1.176303	8.296039	-8.296039	68.824255	34	34	99
27	0	3.590542	0	0.845653	2.132544	-2.132544	4.54774534	108	108	25
28	4	1.450849	0	1.900393	0.461746	-0.461746	0.21320933	123	123	10
29	0	2.969951	4	-0.784838	0	4	16	129	129	0
30	0	1.200083	0	-0.848048	0	0	0	129	129	4
31	0	0.484924	0	-1.107237	0	0	0	129	129	4
32	0	0.195946	0	-1.775736	0	0	0	129	129	4
33	2	0.079177	10	-0.701974	0	10	100	133	133	0
34	2	1.223843	5	-1.405066	0	5	25	131	131	10
35	4	1.666374	5	0.421327	0	5	25	129	129	15
36	8	3.065121	5	0.584317	0.68183	4.3181696	18.6465891	125	125	20
37	20	6.005938	5	0.233442	3.19366	1.8063395	3.26286247	127	127	15
38	12	14.34535	10	-0.562502	11.32297	-1.32297	1.75024844	112	112	15
39	12	12.9477	10	-0.12552	10.63569	-0.635694	0.40410749	105	105	20
40	4	12.38294	10	-0.62264	9.847212	0.1527878	0.0233441	98	98	25
	mean of the disturbance			-0.111904		2.4785481	mean of the standard errors			
	std dev of the disturbance			1.200474						

Σ (AO-Ot)2	328.9008		constraints		
θ	0.60		>=0	<=1	
αs	0.04		>=0	<=1	
β	0.00		>=0	<=1	
S'	49.02		>=0	<=100	

Standard GRG NonLinear

Incoming Orders:
IO = WIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = WOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MWEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = WSL = WSD1+WSD2+DIO+DBL

SHINER GAME MODEL WEEKS 21 TO 40 DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	-0.083666	83.90364	-79.90364	6384.59145	12	12	12
2	4	4	6	1.365408	85.35271	-79.35271	6296.85296	12	12	12
3	5	4	2	-0.653184	83.11338	-81.11338	6579.38111	12	12	14
4	5	5	0	3.394507	89.30581	-89.30581	7975.52741	11	11	12
5	5	5	2	-0.780982	86.49581	-84.49581	7139.54166	10	10	8
6	6	5	4	0.822845	87.61709	-83.61709	6991.81789	11	11	4
7	6	6	4	1.149112	92.41861	-88.41861	7817.85036	7	7	6
8	7	6	12	1.072256	97.44426	-85.44426	7300.72186	1	1	10
9	7	7	10	-0.913294	96.27903	-86.27903	7444.07072	-4	0	20
10	10	7	12	0.185845	96.71596	-84.71596	7176.7937	-7	0	26
11	7	10	18	1.603359	100.2505	-82.25053	6765.14945	-13	0	34
12	13	7	12	-0.913404	94.07156	-82.07156	6735.74048	-8	0	40
13	10	13	6	-1.319157	99.22433	-93.22433	8690.77615	-13	0	44
14	13	10	8	-0.802649	96.96158	-88.96158	7914.16213	-15	0	42
15	20	13	10	0.966513	101.7307	-91.73074	8414.52835	-20	0	42
16	30	20	18	-0.913294	107.0717	-89.07167	7933.76195	-28	0	40
17	35	30	25	0.185845	117.5086	-92.5086	8557.84073	-46	0	48
18	40	35	50	1.603359	122.8224	-72.82243	5303.10656	-66	0	56
19	25	40	60	-0.913404	120.2287	-60.22874	3627.50096	-102	0	102
20	20	25	80	-1.319157	99.41495	-19.41495	376.94037	-116	0	151
21	15	20	80	-0.329871	87.89921	-7.899211	62.3975382	-124	0	219
22	20	15	90	-1.417127	74.63803	15.361968	235.990046	-124	0	284
23	15	20	80	-1.073723	73.35936	6.6406452	44.0981692	-114	0	344
24	10	15	80	0.196687	67.97424	12.025756	144.618811	-84	0	359
25	15	10	30	1.722194	58.95577	-28.95577	838.436634	6	6	359
26	10	15	10	-1.448242	6.243942	3.7560579	14.1079706	71	71	309
27	0	10	0	2.051127	0	0	0	161	161	219
28	0	0	0	1.115331	0	0	0	241	241	139
29	0	0	0	-0.974813	0	0	0	341	341	39
30	4	0	0	-0.063417	0	0	0	380	380	0
31	0	4	0	-0.10297	0	0	0	376	376	0
32	0	0	0	-0.85137	0	0	0	376	376	0
33	0	0	0	-2.36051	0	0	0	376	376	0
34	10	0	0	-1.416713	0	0	0	376	376	0
35	5	10	0	0.69894	0	0	0	366	366	0
36	5	5	0	-0.171056	0	0	0	361	361	0
37	5	5	0	-1.002555	0	0	0	356	356	0
38	5	5	0	0.15039	0	0	0	351	351	0
39	10	5	0	0.756149	0	0	0	346	346	0
40	10	10	0	-0.366215	0	0	0	336	336	0
	mean of the disturbance			-0.014789		-46.11434	mean of the standard errors			
	std dev of the disturbance			1.269052						

Σ (AO-Ot)2	1339.649		constraints	
θ	1.00		>=0	<=1
αs	0.92		>=0	<=1
β	0.12		>=0	<=1
S'	100.00		>=0	<=100

GRG NonLinear

Incoming Orders:
IO = DIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = DOP
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MDEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = DSL = DSD1+DSD2+FIO+FBL

SHINER GAME MODEL WEEKS 21 TO 40 FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	0.700185	50.08976	-46.08976	2124.26584	12	12	8
2	4	4	6	0.3835	49.77307	-43.77307	1916.08193	12	12	8
3	6	4	6	-0.297961	48.5947	-42.5947	1814.3085	12	12	10
4	2	6	5	-1.349018	50.12349	-45.12349	2036.12904	10	10	12
5	0	2	3	-0.720111	44.84734	-41.84734	1751.19979	14	14	11
6	2	0	0	0.421757	41.50431	-41.50431	1722.60771	20	20	8
7	4	2	0	-2.101527	40.60817	-40.60817	1649.02373	23	23	3
8	4	4	2	1.256917	47.25036	-45.25036	2047.59528	22	22	0
9	12	4	8	1.203565	48.85361	-40.85361	1669.01735	18	18	2
10	10	12	8	1.730997	61.85392	-53.85392	2900.24504	6	6	10
11	12	10	12	1.054394	60.91685	-48.91685	2392.85819	-2	0	16
12	18	12	12	0.080957	60.94959	-48.94959	2396.06233	-6	0	20
13	12	18	15	-0.495773	65.37904	-50.37904	2538.04727	-16	0	24
14	6	12	4	-1.348921	57.78052	-53.78052	2892.34436	-16	0	27
15	8	6	11	1.480804	56.59789	-45.59789	2079.1678	-10	0	19
16	10	8	12	-0.710225	57.40069	-45.40069	2061.22234	-3	0	15
17	18	10	15	-0.328747	57.79452	-42.79452	1831.37074	-9	0	23
18	25	18	30	-0.519275	64.61017	-34.61017	1197.86359	-16	0	27
19	50	25	65	0.454842	68.11208	-3.112077	9.68502069	-29	0	45
20	60	50	80	0.588563	80.823	-0.823002	0.67733228	-64	0	95
21	80	60	80	-2.444116	75.36753	4.6324726	21.4598025	-94	0	145
22	80	80	100	1.088316	95.17312	4.8268791	23.2987617	-109	0	160
23	90	80	80	-0.225566	88.89012	-8.89012	79.0342381	-109	0	180
24	80	90	100	-0.026329	99.09936	0.9106432	0.82927102	-119	0	180
25	80	80	80	1.361578	90.47726	-10.47726	109.773064	-99	0	180
26	30	80	100	-0.385543	88.73014	11.269856	127.00966	-99	0	180
27	10	30	30	-0.430911	38.68478	-8.684775	75.4253172	-29	0	180
28	0	10	20	-0.333644	9.13136	10.86864	118.127328	41	41	130
29	0	0	15	-0.669984	0	15	225	141	141	50
30	0	0	0	-0.518139	0	0	0	171	171	35
31	0	0	0	0.064445	0	0	0	191	191	15
32	0	0	0	-1.941866	0	0	0	206	206	0
33	0	0	0	-0.695992	0	0	0	206	206	0
34	0	0	0	-0.430911	0	0	0	206	206	0
35	0	0	0	-0.333644	0	0	0	206	206	0
36	0	0	0	-0.669984	0	0	0	206	206	0
37	0	0	0	-0.518139	0	0	0	206	206	0
38	0	0	0	0.064445	0	0	0	206	206	0
39	0	0	0	-1.941866	0	0	0	206	206	0
40	0	0	0	-0.695992	0	0	0	206	206	0
	mean of the disturbance			-0.126782		-22.75448	mean of the standard errors			
	std dev of the disturbance			1.010473						

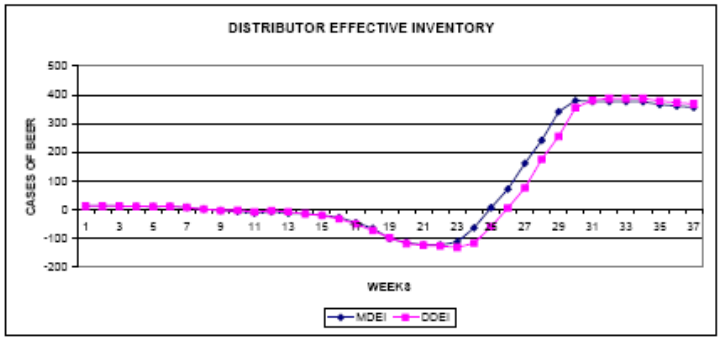
		constraints	
Σ (AO-Ot)2	779.9574		
θ	1.00	>=0	<=1
αs	0.54	>=0	<=1
β	0.46	>=0	<=1
S'	100.00	>=0	<=100

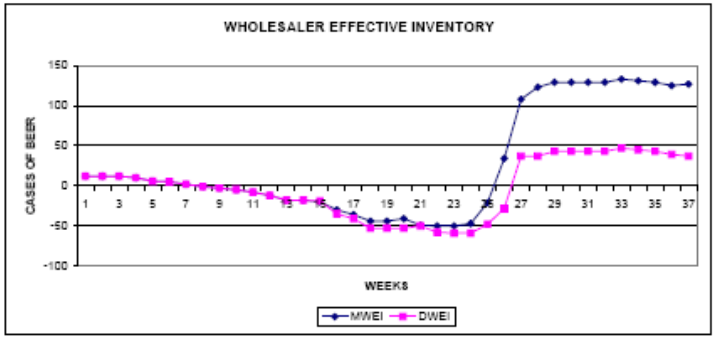
GRG NonLinear

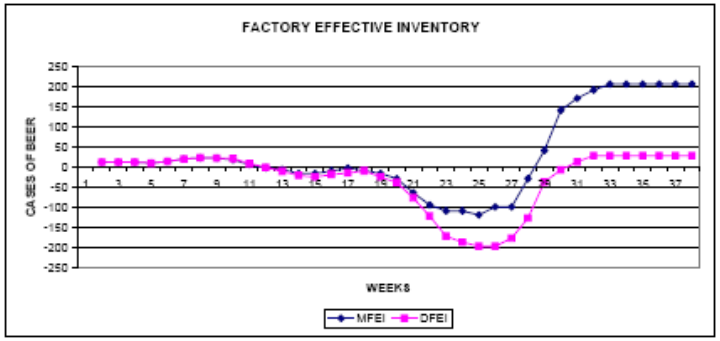
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$
Squared errors:
$(AO - O_t)^2$
Effective Inventory:
EI = MFEI
Stock:
St = MAX(0,EI)
Supply Line:
SLt = FSL = FPD1+FPD2

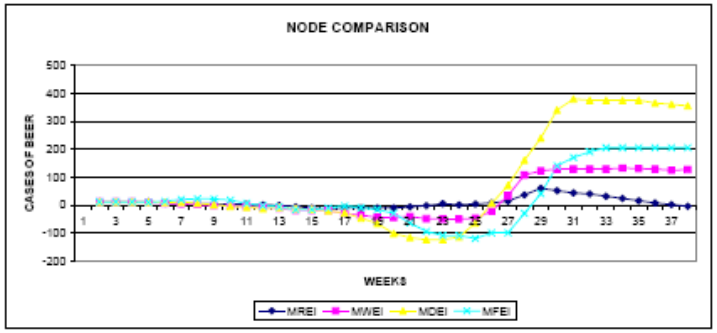
SHINER GAME MODEL WEEKS 21 TO 40

MODEL CHARTS



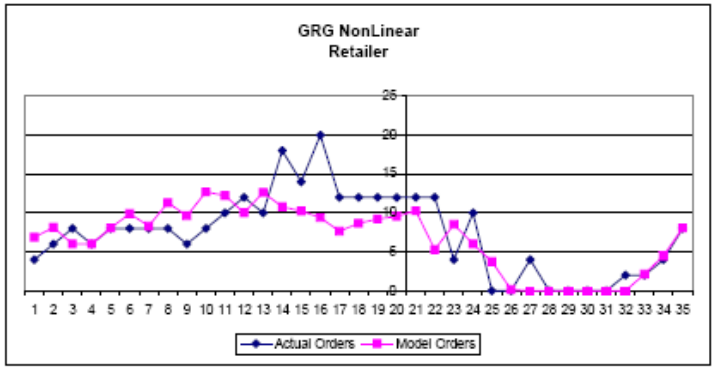


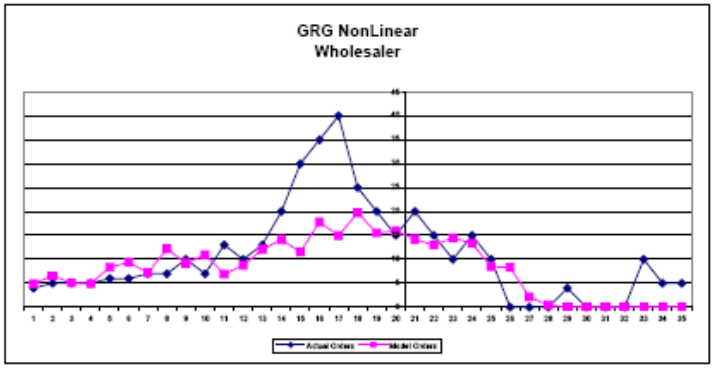


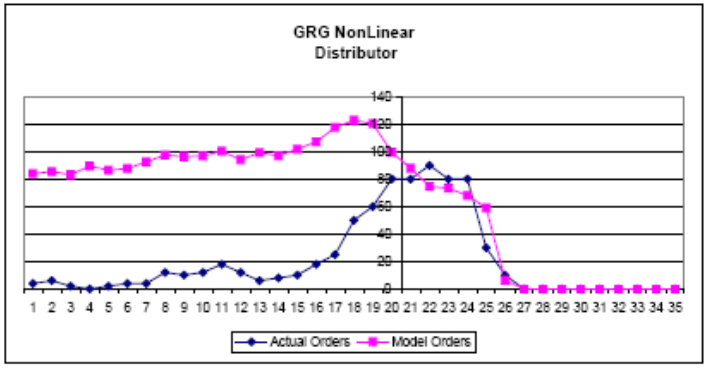


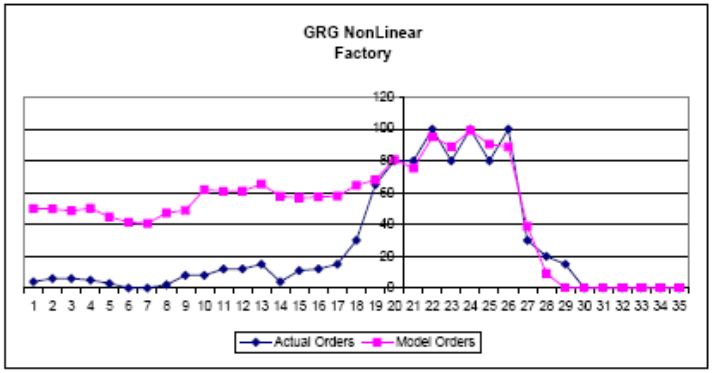
SHINER GAME MODEL WEEKS 21 TO 40

ORDER CHARTS









SHINER GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 1
Receive The Inventory and Advance the shipping Delays

STEP 2
Look at the incoming orders and fill orders
all incoming orders + backlog

	SHINER	NO IT							SHINER	Retailer	NO IT					
	Team Costs	$ 7,126.50							Costs	$ 315.00						
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	*DREI*	RCOSTS	ROP	WIO	RSL		WINV1	WSD1
0	0	12	4	4	0	4	12			0	4	4			12	4
1	4	16	4	4	0	4	12	12	*12*	6	4	4	12		16	4
2	4	16	4	4	0	4	12	12	*12*	12	6	4	12		16	4
3	4	16	4	4	0	4	12	12	*12*	18	8	6	14		16	4
4	4	16	4	6	0	4	12	12	*12*	24	6	8	18		16	4
5	8	16	6	8	0	8	8	8	*8*	28	8	6	20		14	5
6	8	14	8	6	0	8	6	6	*6*	31	8	8	22		11	5
7	8	14	6	8	0	8	6	6	*6*	34	8	8	22		10	5
8	8	12	8	7	0	8	4	4	*4*	36	8	8	24		7	6
9	8	12	7	6	0	8	4	4	*4*	38	6	8	24		6	6
10	8	11	6	6	0	8	3	3	*3*	39.5	8	6	23		6	3
11	8	9	6	3	0	8	1	1	*1*	40	10	8	25		3	4
12	8	7	3	4	1	7	0	-1	*-1*	41	12	10	29		4	4
13	8	3	4	4	6	3	0	-6	*-6*	47	10	12	38		4	12
14	8	4	4	12	10	4	0	-10	*-10*	57	18	10	44		12	8
15	8	4	12	8	14	4	0	-14	*0*	71	14	18	58		8	8
16	8	12	8	8	10	12	0	-10	*0*	81	20	14	60		8	8
17	8	8	8	8	10	8	0	-10	*-14*	91	12	20	72		8	12
18	8	8	8	12	10	8	0	-10	*-10*	101	12	12	76		12	12
19	8	8	12	12	10	8	0	-10	*-9*	111	12	12	80		12	15
20	8	12	12	15	6	12	0	-6	*-15*	117	12	12	80		15	4
21	8	12	15	4	2	12	0	-2	*-15*	119	12	12	80		4	11
22	8	15	4	11	0	10	5	5	*-15*	121.5	12	12	77		11	12
23	8	9	11	12	0	8	1	1	*-11*	122	4	12	85		12	15
24	8	12	12	15	0	8	4	4	*-7*	124	10	4	78		15	30
25	8	16	15	30	0	8	8	8	*0*	128	0	10	76		30	65
26	8	23	30	31	0	8	15	15	*-4*	135.5	0	0	61		65	74
27	8	45	31	0	0	8	37	37	*9*	154	4	0	31		108	15
28	8	68	0	0	0	8	60	60	*29*	184	0	4	4		123	10
29	8	60	0	4	0	8	52	52	*52*	210	0	0	4		133	0
30	8	52	4	0	0	8	44	44	*44*	232	0	0	4		129	0
31	8	48	0	0	0	8	40	40	*48*	252	0	0	0		129	0
32	8	40	0	0	0	8	32	32	*38*	268	2	0	0		129	4
33	8	32	0	0	0	8	24	24	*24*	280	2	2	2		133	0
34	8	24	0	2	0	8	16	16	*16*	288	4	2	4		133	0
35	8	16	2	2	0	8	8	8	*8*	292	8	4	8		131	0
36	8	10	2	4	0	8	2	2	*2*	293	20	8	14		129	10
37	8	4	4	8	4	4	0	-4	*-4*	297	12	20	32		135	5
38	8	4	8	20	8	4	0	-8	*-8*	305	12	12	40		132	5
39	8	8	20	12	8	8	0	-8	*-8*	313	4	12	44		117	5
40	8	20	12	12	0	16	4	4	*4*	315	8	4	28		110	5

SHINER GAME MODEL WEEKS 21 TO 40 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					SHINER Costs	Wholesaler $ 1,397.00		NO IT									SHINER Costs
WEEK	WSD2	WBL	WINV2	MWEI	*DWEI*	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	*DDEI*
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	*12*	6	4	4	12		16	4	4	0	12	12	*12*
2	4	0	12	12	*12*	12	5	4	12		16	4	4	0	12	12	*12*
3	4	0	12	12	*12*	18	5	5	13		16	4	4	0	12	12	*12*
4	5	0	10	10	*10*	23	5	5	14		16	4	6	0	11	11	*11*
5	5	0	6	6	*6*	26	6	5	15		15	6	2	0	10	10	*10*
6	5	0	5	5	*5*	28.5	6	6	16		16	2	0	0	11	11	*11*
7	6	0	2	2	*2*	29.5	7	6	17		13	0	2	0	7	7	*7*
8	6	1	0	-1	*-1*	30.5	7	7	19		7	2	4	0	1	1	*1*
9	3	3	0	-3	*-3*	33.5	10	7	20		3	4	4	4	0	-4	*-4*
10	4	5	0	-5	*-5*	38.5	7	10	24		4	4	12	7	0	-7	*-3*
11	4	8	0	-8	*-8*	46.5	13	7	28		4	12	8	13	0	-13	*-9*
12	12	12	0	-12	*-12*	58.5	10	13	37		12	8	8	8	0	-8	*-4*
13	8	18	0	-18	*-18*	76.5	13	10	43		8	8	8	13	0	-13	*-8*
14	8	18	0	-18	*-18*	94.5	20	13	44		8	8	12	15	0	-15	*-16*
15	8	20	0	-20	*-19*	114.5	30	20	56		8	12	12	20	0	-20	*-21*
16	12	30	0	-30	*-35*	144.5	35	30	78		12	12	15	28	0	-28	*-33*
17	12	36	0	-36	*-41*	180.5	40	35	105		12	15	4	46	0	-46	*-51*
18	15	44	0	-44	*-53*	224.5	25	40	133		15	4	11	66	0	-66	*-74*
19	4	44	0	-44	*-53*	268.5	20	25	146		4	11	12	102	0	-102	*-99*
20	11	41	0	-41	*-53*	309.5	15	20	151		11	12	15	116	0	-116	*-120*
21	12	49	0	-49	*-50*	358.5	20	15	162		12	15	30	124	0	-124	*-125*
22	15	50	0	-50	*-58*	408.5	15	20	171		15	30	65	124	0	-124	*-128*
23	30	50	0	-50	*-59*	458.5	10	15	174		30	65	80	114	0	-114	*-133*
24	65	47	0	-47	*-59*	505.5	15	10	169		65	80	80	64	0	-64	*-118*
25	74	21	0	-21	*-48*	526.5	10	15	154		80	80	100	0	6	6	*-60*
26	15	0	34	34	*-28*	543.5	0	10	99		86	100	80	0	71	71	*5*
27	10	0	108	108	*37*	597.5	0	0	25		171	80	100	0	161	161	*75*
28	0	0	123	123	*37*	659	0	0	10		241	100	39	0	241	241	*175*
29	0	0	129	129	*43*	723.5	4	0	0		341	39	0	0	341	341	*255*
30	0	0	129	129	*43*	788	0	4	4		380	0	0	0	380	380	*355*
31	4	0	129	129	*43*	852.5	0	0	4		380	0	0	0	376	376	*381*
32	0	0	129	129	*43*	917	0	0	4		376	0	0	0	376	376	*388*
33	0	0	133	133	*47*	983.5	10	0	0		376	0	0	0	376	376	*388*
34	0	0	131	131	*45*	1049	5	10	10		376	0	0	0	376	376	*388*
35	10	0	129	129	*43*	1113.5	5	5	15		376	0	0	0	366	366	*378*
36	5	0	125	125	*39*	1176	5	5	20		366	0	0	0	361	361	*373*
37	5	0	127	127	*37*	1239.5	5	5	15		361	0	0	0	356	356	*368*
38	5	0	112	112	*26*	1295.5	10	5	15		356	0	0	0	351	351	*363*
39	5	0	105	105	*19*	1348	10	10	20		351	0	0	0	346	346	*358*
40	10	0	98	98	*12*	1397	10	10	25		346	0	0	0	336	336	*348*

SHINER GAME MODEL WEEKS 21 TO 40

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		NO IT									SHINER	Factory	NO IT	
	$ 3,312.00											Costs	$ 2,102.50		
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	*DFEI*	FCOSTS	FPR	FSL
0	0	4	4	12		12	4	4	0	12			0	4	8
1	6	4	4	12		16	4	4	0	12	12	*12*	6	4	8
2	12	6	4	12		16	4	4	0	12	12	*12*	12	6	8
3	18	2	6	14		16	4	6	0	12	12	*12*	18	6	10
4	23.5	0	2	12		16	6	6	0	10	10	*10*	23	5	12
5	28.5	2	0	8		16	6	5	0	14	14	*14*	30	3	11
6	34	4	2	4		20	5	3	0	20	20	*20*	40	0	8
7	37.5	4	4	6		25	3	0	0	23	23	*23*	51.5	0	3
8	38	12	4	10		26	0	0	0	22	22	*22*	62.5	2	0
9	42	10	12	20		22	0	2	0	18	18	*21*	71.5	8	2
10	49	12	10	26		18	2	8	0	6	6	*9*	74.5	8	10
11	62	18	12	34		8	8	8	2	0	-2	*-1*	76.5	12	16
12	70	12	18	40		8	8	12	6	0	-6	*-11*	82.5	12	20
13	83	6	12	44		8	12	12	16	0	-16	*-21*	98.5	15	24
14	98	8	6	42		12	12	15	16	0	-16	*-25*	114.5	4	27
15	118	10	8	42		12	15	4	10	0	-10	*-19*	124.5	11	19
16	146	18	10	40		15	4	11	3	0	-3	*-15*	127.5	12	15
17	192	25	18	46		4	11	12	9	0	-9	*-10*	136.5	15	23
18	258	50	25	56		11	12	15	16	0	-16	*-25*	152.5	30	27
19	360	60	50	102		12	15	30	29	0	-29	*-39*	181.5	65	45
20	476	80	60	151		15	30	65	64	0	-64	*-77*	245.5	80	95
21	600	80	80	219		30	65	80	94	0	-94	*-122*	339.5	80	145
22	724	90	80	284		65	80	80	109	0	-109	*-172*	448.5	100	160
23	838	80	90	344		80	80	100	109	0	-109	*-187*	557.5	80	180
24	902	80	80	359		80	100	80	119	0	-119	*-197*	676.5	100	180
25	905	30	80	359		100	80	100	99	0	-99	*-197*	775.5	80	180
26	940.5	10	30	309		80	100	80	99	0	-99	*-177*	874.5	100	180
27	1021	0	10	219		100	80	100	29	0	-29	*-127*	903.5	30	180
28	1141.5	0	0	139		80	100	30	0	41	41	*-37*	924	20	130
29	1312	0	0	39		141	30	20	0	141	141	*-7*	994.5	15	50
30	1502	0	0	0		171	20	15	0	171	171	*13*	1080	0	35
31	1690	0	0	0		191	15	0	0	191	191	*28*	1175.5	0	15
32	1878	0	0	0		206	0	0	0	206	206	*28*	1278.5	0	0
33	2066	0	0	0		206	0	0	0	206	206	*28*	1381.5	0	0
34	2254	0	0	0		206	0	0	0	206	206	*28*	1484.5	0	0
35	2437	0	0	0		206	0	0	0	206	206	*28*	1587.5	0	0
36	2617.5	0	0	0		206	0	0	0	206	206	*28*	1690.5	0	0
37	2795.5	0	0	0		206	0	0	0	206	206	*28*	1793.5	0	0
38	2971	0	0	0		206	0	0	0	206	206	*28*	1896.5	0	0
39	3144	0	0	0		206	0	0	0	206	206	*28*	1999.5	0	0
40	3312	0	0	0		206	0	0	0	206	206	*28*	2102.5	0	0

SHINER GAME MODEL WEEKS 21 TO 40 MODEL DATA

SHINER NO IT Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	6	12	5	12	6	12	6	12
3	8	12	5	12	2	12	6	12
4	6	12	5	10	0	11	5	10
5	8	8	6	6	2	10	3	14
6	8	6	6	5	4	11	0	20
7	8	6	7	2	4	7	0	23
8	8	4	7	-1	12	1	2	22
9	6	4	10	-3	10	-4	8	21
10	8	3	7	-5	12	-3	8	9
11	10	1	13	-8	18	-9	12	-1
12	12	-1	10	-12	12	-4	12	-11
13	10	-6	13	-18	6	-8	15	-21
14	18	-10	20	-18	8	-16	4	-25
15	14	0	30	-19	10	-21	11	-19
16	20	0	35	-35	18	-33	12	-15
17	12	-14	40	-41	25	-51	15	-10
18	12	-10	25	-53	50	-74	30	-25
19	12	-9	20	-53	60	-99	65	-39
20	12	-15	15	-53	80	-120	80	-77
21	12	-15	20	-50	80	-125	80	-122
22	12	-15	15	-58	90	-128	100	-172
23	4	-11	10	-59	80	-133	80	-187
24	10	-7	15	-59	80	-118	100	-197
25	0	0	10	-48	30	-60	80	-197
26	0	-4	0	-28	10	5	100	-177
27	4	9	0	37	0	75	30	-127
28	0	29	0	37	0	175	20	-37
29	0	52	4	43	0	255	15	-7
30	0	44	0	43	0	355	0	13
31	0	48	0	43	0	381	0	28
32	2	38	0	43	0	388	0	28
33	2	24	10	47	0	388	0	28
34	4	16	5	45	0	388	0	28
35	8	8	5	43	0	378	0	28
36	20	2	5	39	0	373	0	28
37	12	-4	5	37	0	368	0	28
38	12	-8	10	26	0	363	0	28
39	4	-8	10	19	0	358	0	28
40	8	4	10	12	0	348	0	28