HEINEKEN MODEL wks 1 to 20 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	5.492592	-1.492592	2.22783077	12	12	12
2	4	0.46	4	-0.665985	5.13043	-1.13043	1.27787166	12	12	12
3	4	0.86	8	-0.05814	6.144019	1.8559805	3.44486366	12	12	12
4	4	1.22	8	0.717213	7.278833	0.7213666	0.52036978	12	12	16
5	8	1.54	12	2.171013	11.42306	0.5769391	0.33285867	8	8	20
6	8	2.28	12	-1.096223	11.26825	0.73175	0.53545799	4	4	28
7	8	2.94	12	0.14198	13.16159	-1.161593	1.34929715	4	4	32
8	8	3.52	12	-1.662125	11.93757	0.0624255	0.00389695	4	4	36
9	8	4.03	12	-1.008845	11.91822	0.0817755	0.00668724	6	6	38
10	8	4.48	12	-0.181543	13.79345	-1.793447	3.21645257	5	5	43
11	8	4.89	12	-0.242194	12.94922	-0.949225	0.90102797	7	7	45
12	8	5.24	12	-0.867531	13.27358	-1.273576	1.62199581	6	6	50
13	8	5.56	16	0.047029	16.28324	-0.283238	0.08022363	3	3	57
14	8	5.84	16	-0.734036	14.59545	1.4045454	1.97274777	5	5	63
15	8	6.09	16	-0.484069	12.72042	3.2795831	10.7556652	9	9	67
16	8	6.31	8	-0.506707	9.951288	-1.951288	3.8075257	14	14	70
17	8	6.50	8	-0.986039	5.514097	2.485903	6.17971375	21	21	63
18	8	6.67	0	1.774695	1.328988	-1.328988	1.76620946	33	33	51
19	8	6.82	0	0.331517	0	0	0	60	60	16
20	8	6.96	0	0.65131	0	0	0	60	60	8
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.125218		-0.008205	mean of the standard errors			
	std dev of the disturbance			0.94365						

Σ (AO-Ot)2	40.0005		constraints		
θ	0.11		>=0	<=1	
αs	0.59		>=0	<=1	
β	0.00		>=0	<=1	
S'	21.00		>=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

HEINEKEN MODEL wks 1 to 20 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	0.994095	4	1.7319	12.72599	-8.725995	76.1429849	12	12	12
2	4	1.741134	4	1.399065	13.1402	-9.140199	83.543231	12	12	12
3	4	2.302516	6	-1.25361	11.04891	-5.048906	25.4914527	12	12	12
4	8	2.724381	7	-0.254401	12.46998	-5.46998	29.9206862	12	12	14
5	8	4.035498	10	-0.247477	17.78802	-7.788021	60.6532644	8	8	17
6	12	5.020771	12	-0.455735	22.56504	-10.56504	111.61999	4	4	23
7	12	6.755276	15	0.006949	28.76222	-13.76222	189.398829	-2	0	29
8	12	8.058714	19	-0.63034	29.42837	-10.42837	108.750994	-7	0	37
9	12	9.038218	21	1.820178	32.8584	-11.8584	140.621545	-9	0	46
10	12	9.774291	30	1.630399	33.40469	-3.40469	11.5919119	-14	0	60
11	12	10.32743	45	0.111647	32.43908	12.56092	157.776709	-21	0	85
12	12	10.74311	45	-0.846729	31.89638	13.103623	171.704941	-23	0	120
13	12	11.05547	44	0.144824	33.2003	10.799703	116.633581	-23	0	153
14	16	11.29021	44	-1.35386	31.93635	12.063649	145.531622	-22	0	184
15	16	12.46071	46	-0.2348	34.22591	11.774094	138.629298	-23	0	213
16	16	13.3403	50	-2.191945	33.14836	16.851641	283.977792	-19	0	239
17	8	14.0013	36	1.103523	25.10483	10.895175	118.704834	12	12	242
18	8	12.50984	0	-0.520866	0	0	0	37	37	245
19	0	11.38903	0	-0.846729	0	0	0	79	79	195
20	0	8.558588	0	0.144824	0	0	0	154	154	120
21										
22										
23										
24										
25										
26										
27										
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29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.037159		0.0928492	mean of the standard errors			
	std dev of the disturbance			1.0972						

Σ (AO-Ot)2	1970.694		constraints	
θ	0.25		>=0	<=1
αs	1.00		>=0	<=1
β	0.00		>=0	<=1
S'	22.00		>=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

HEINEKEN MODEL wks 1 to 20 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	-0.247002	12.67946	-8.67946	75.3330341	12	12	12
2	4	4	4	1.111074	14.03754	-10.03754	100.752147	12	12	12
3	4	4	6	0.265825	13.19229	-7.192288	51.7290016	12	12	12
4	6	4	4	-0.484326	12.26321	-8.263214	68.2807031	12	12	14
5	7	6	5	0.923178	17.67072	-12.67072	160.547102	10	10	14
6	10	7	10	-0.225013	20.43307	-10.43307	108.848857	7	7	15
7	12	10	12	0.13773	27.43796	-15.43796	238.330694	3	3	19
8	15	12	15	1.202202	32.78674	-17.78674	316.368223	-5	0	27
9	19	15	20	-0.069958	33.61997	-13.61997	185.503554	-15	0	37
10	21	19	30	-0.067508	36.7278	-6.727805	45.2633556	-24	0	47
11	30	21	30	1.1112	38.29621	-8.296207	68.8270479	-33	0	65
12	45	30	50	-2.385819	42.27834	7.7216568	59.6239838	-50	0	82
13	45	45	100	-0.473977	56.05903	43.940965	1930.80844	-80	0	117
14	44	45	250	0.035374	49.41147	200.58853	40235.758	-105	0	197
15	44	44	0	1.27837	31.4938	-31.4938	991.85918	-102	0	400
16	46	44	20	-0.676212	32.49144	-12.49144	156.036099	-113	0	367
17	50	46	0	0.141946	37.99344	-37.99344	1443.50165	-109	0	337
18	36	50	0	-1.190505	47.3706	-47.3706	2243.97362	-84	0	262
19	0	36	0	-0.351055	0	0	0	122	122	20
20	0	0	0	-0.622006	0	0	0	142	142	0
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.029324		0.1878452	mean of the standard errors			
	std dev of the disturbance			0.893014						

Σ (AO-Ot)2	48481.34		constraints		
θ	1.00		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.09		>=0	<=1	
S'	22.00		>=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

HEINEKEN MODEL wks 1 to 20 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	1.115672	4	-2.290003	24.65287	-20.65287	426.540859	12	12	8
2	4	1.920163	4	-1.349261	26.3981	-22.3981	501.67481	12	12	8
3	4	2.500267	4	-0.045087	28.28238	-24.28238	589.633773	12	12	8
4	6	2.918589	6	0.389153	29.11492	-23.11492	534.299477	12	12	8
5	4	3.778035	8	-0.169816	30.91126	-22.91126	524.925645	10	10	10
6	5	3.839945	10	-0.889105	30.25388	-20.25388	410.219534	10	10	14
7	10	4.163505	6	-0.724693	30.00393	-24.00393	576.188601	11	11	18
8	12	5.791408	15	-0.627018	33.20535	-18.20535	331.43466	9	9	16
9	15	7.523096	20	-0.757398	36.28249	-16.28249	265.119601	7	7	21
10	20	9.608539	50	0.724461	45.01523	4.9847653	24.8478854	-2	0	35
11	30	12.5069	30	-1.865115	45.32402	-15.32402	234.825697	-7	0	70
12	30	17.38604	50	-1.214404	50.85387	-0.853874	0.72909998	-17	0	80
13	50	20.9043	75	0.080862	53.45364	21.546361	464.245675	3	3	80
14	100	29.01961	250	-0.26075	63.4411	186.5589	34804.2239	-17	0	125
15	250	48.81732	100	-0.207698	83.29185	16.708147	279.162184	-67	0	325
16	0	104.9308	100	0.582056	140.1951	-40.19507	1615.64326	-242	0	350
17	20	75.6637	100	0.624549	105.0671	-5.067124	25.6757479	8	8	200
18	0	60.1381	50	-2.290003	27.59338	22.406623	502.056756	88	88	200
19	0	43.3645	20	-1.349261	0	20	400	188	188	150
20	0	31.26937	0	-0.045087	0	0	0	288	288	70
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
		mean of the disturbance		-0.585181		0.9329775	mean of the standard errors			
		std dev of the disturbance		0.919295						

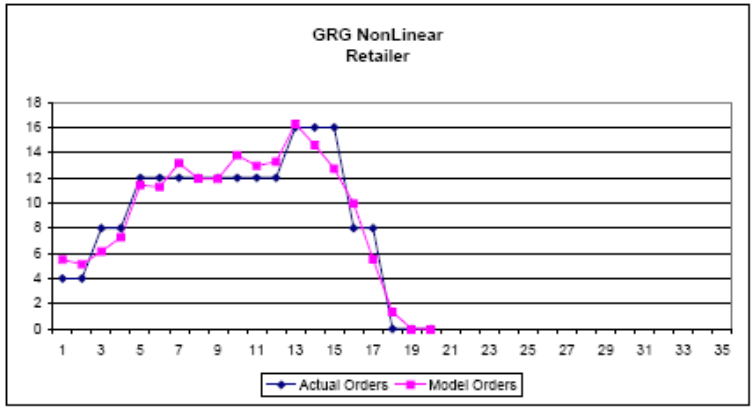
			constraints		
Σ (AO-Ot)2	42511.45				
θ	0.28		>=0	<=1	
αs	0.74		>=0	<=1	
β	0.00		>=0	<=1	
S'	47.00		>=0	<=100	INT

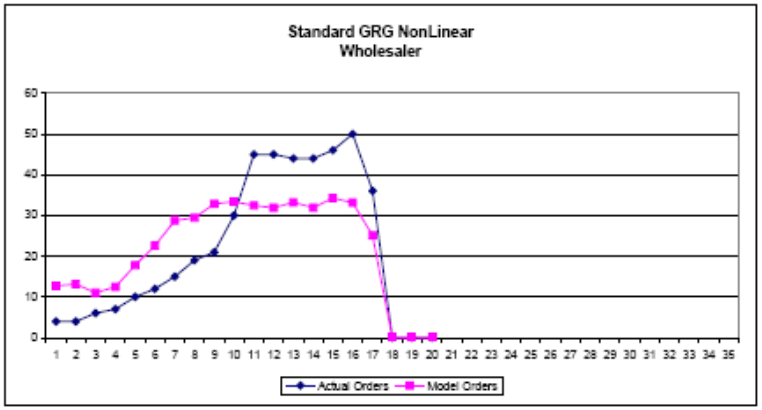
GRG NonLinear

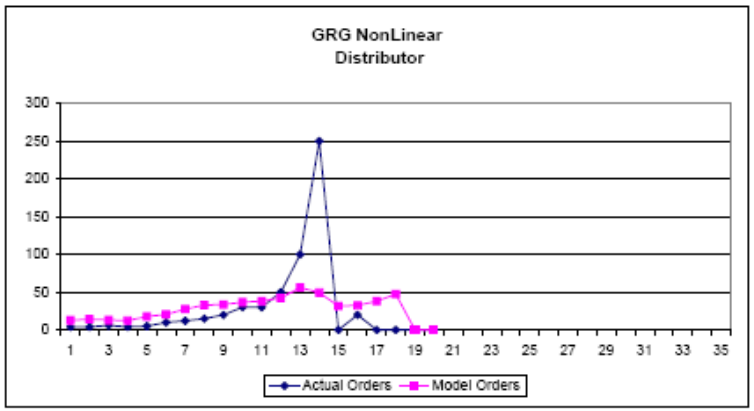
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$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

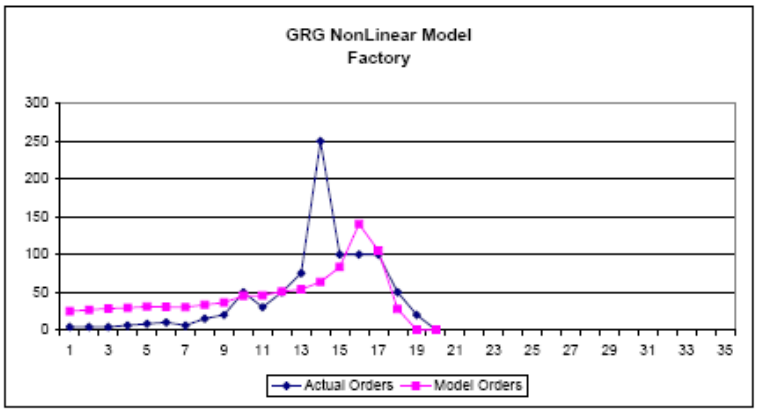
HEINEKEN MODEL wks 1 to 20

ORDER CHARTS



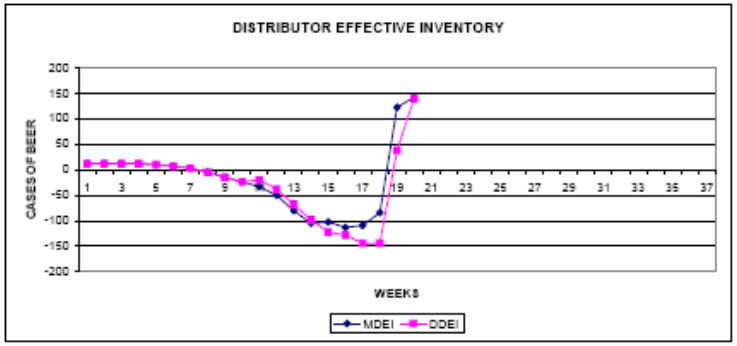


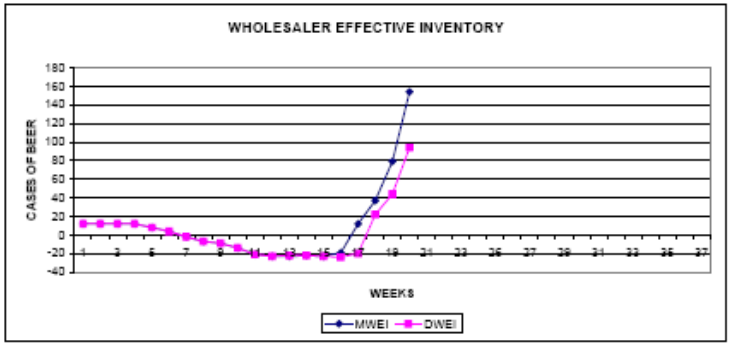


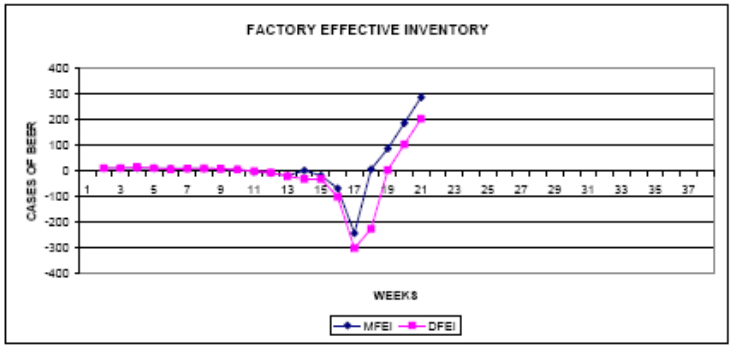


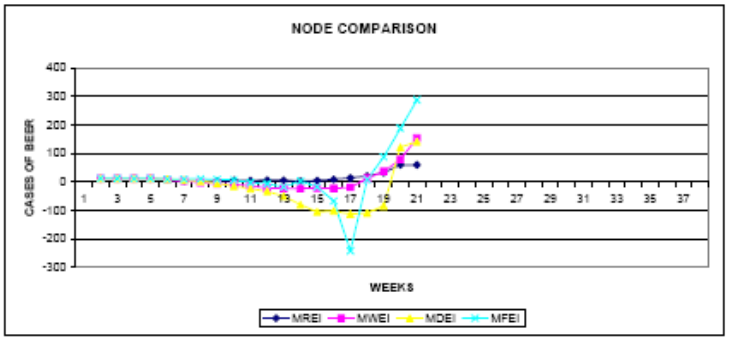
HEINEKEN MODEL wks 1 to 20

MODEL CHARTS









HEINEKEN MODEL wks 1 to 20

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	$ 2,055.50							Costs	$ 148.50					
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

HEINEKEN MODEL wks 1 to 20

MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					HEINEKEN	Wholesaler		IT								HEINEKEN
					Costs	$ 334.00										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	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*

HEINEKEN MODEL wks 1 to 20

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									HEINEKEN Costs	Factory	IT		
	$ 886.00												$ 687.00			
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	

HEINEKEN MODEL wks 1 to 20

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

HIRES ROOT BEER MODEL WKS 1 to 20 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	3.148868	0.8513322	0.72476652	12	12	12
2	4	0.70	4	-0.665985	3.027625	0.9723753	0.94551367	12	12	12
3	4	1.28	5	-0.05814	4.212554	0.7874464	0.62007176	12	12	12
4	4	1.75	5	0.717213	5.301772	-0.301772	0.09106638	12	12	13
5	8	2.15	8	2.171013	8.633545	-0.633545	0.40137942	8	8	14
6	8	3.17	5	-1.096223	7.387982	-2.387982	5.70245778	4	4	18
7	8	4.01	7	0.14198	10.70633	-3.706332	13.7368967	1	1	18
8	8	4.71	10	-1.662125	9.68838	0.3136205	0.09835779	-2	0	20
9	8	5.29	10	-1.008845	10.59012	-0.590116	0.34823648	-2	0	22
10	8	5.76	12	-0.181543	11.08037	0.9196345	0.84572771	-5	0	27
11	8	6.15	10	-0.242194	10.59969	-0.599693	0.35963216	-6	0	32
12	8	6.48	8	-0.867531	10.29747	-2.29747	5.27836938	-4	0	32
13	8	6.74	20	0.047029	11.80329	8.19671	67.1880542	-2	0	30
14	8	6.96	10	-0.734036	9.119991	0.8800086	0.7744152	2	2	38
15	8	7.14	12	-0.484069	8.727816	3.2721841	10.7071888	4	4	38
16	8	7.29	8	-0.506707	8.205698	-0.205698	0.04231162	4	4	42
17	8	7.42	8	-0.986039	7.849974	0.1500262	0.02250785	4	4	42
18	8	7.52	8	1.774695	10.21356	-2.213563	4.89985971	6	6	40
19	8	7.60	8	0.331517	10.02714	-2.027135	4.10927665	-2	0	48
20	8	7.67	8	0.65131	9.24389	-1.24389	1.54726248	6	6	40
21										
22										
23										
24										
25										
26										
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31										
32										
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34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.125219		0.0068071	mean of the standard errors			
	std dev of the disturbance			0.94365						

Σ (AO-Ot)2	118.4414		constraints		
θ	0.17		>=0	<=1	
αs	0.41		>=0	<=1	
β	0.39		>=0	<=1	
S'	24.00		>=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

HIRES ROOT BEER MODEL WKS 1 to 20 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	0.331838	4	1.7319	5.063738	-1.063738	1.13153773	12	12	12
2	4	0.636147	4	1.399065	5.035212	-1.035212	1.07166286	12	12	12
3	4	0.915211	6	-1.25361	2.661601	3.3383994	11.1449105	12	12	12
4	5	1.171123	5	-0.254401	3.916722	1.0832776	1.17349032	12	12	14
5	5	1.488765	8	-0.247477	5.241287	2.7587125	7.61049492	11	11	15
6	8	1.780055	10	-0.455735	6.32432	3.6756797	13.5106212	10	10	19
7	5	2.296059	8	0.006949	9.303008	-1.303008	1.69782963	8	8	23
8	7	2.520376	7	-0.63034	8.890036	-1.890036	3.57223794	8	8	26
9	10	2.892004	8	1.820178	10.71218	-2.712182	7.35592941	9	9	25
10	10	3.48168	8	1.630399	11.11208	-3.112078	9.68503097	9	9	23
11	12	4.022436	8	0.111647	12.13408	-4.134084	17.0906473	7	7	23
12	10	4.684251	12	-0.846729	16.83752	-4.837522	23.4016221	2	2	24
13	8	5.125243	12	0.144824	20.27007	-8.270066	68.3939982	0	0	28
14	20	5.363731	25	-1.35386	19.00987	5.9901284	35.8816384	0	0	32
15	10	6.577949	30	-0.2348	21.34315	8.656851	74.94107	-12	0	49
16	12	6.861841	20	-2.191945	19.6699	0.3301045	0.108969	-12	0	69
17	8	7.2881	20	1.103523	23.39162	-3.391623	11.5031053	-24	0	89
18	8	7.347159	20	-0.520866	21.82629	-1.826292	3.33534387	-16	0	93
19	8	7.401318	20	-0.846729	21.55459	-1.554589	2.41674813	-6	0	95
20	8	7.450984	30	0.144824	20.59581	9.4041921	88.4388287	2	2	99
21										
22										
23										
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37										
38										
39										
40										
	mean of the disturbance			-0.037159		0.0053457	mean of the standard errors			
	std dev of the disturbance			1.0972						

Σ (AO-Ot)2	383.4657		constraints		
θ	0.08		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.00		>=0	<=1	
S'	15.00		>=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

HIRES ROOT BEER MODEL WKS 1 to 20 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	1.015281	4	-0.247002	2.768279	1.2317213	1.51713747	12	12	12
2	4	1.772883	4	1.111074	4.883937	-0.883937	0.78134493	12	12	12
3	4	2.338155	8	0.265825	4.60398	3.3960196	11.5329494	12	12	12
4	6	2.759965	8	-0.484326	4.275639	3.7243608	13.8708633	12	12	16
5	5	3.582352	12	0.923178	8.50553	3.49447	12.2113203	10	10	20
6	8	3.942179	10	-0.225013	8.717167	1.2828334	1.64586153	9	9	28
7	10	4.972136	6	0.13773	10.10987	-4.109866	16.8910025	9	9	30
8	8	6.24831	6	1.202202	14.45051	-8.450512	71.4111471	7	7	28
9	7	6.692924	4	-0.069958	9.622966	-5.622966	31.6177514	11	11	22
10	8	6.770866	4	-0.067508	6.703359	-2.703359	7.30814738	14	14	16
11	8	7.082845	0	1.1112	10.19405	-10.19405	103.918565	12	12	14
12	8	7.315638	16	-2.385819	8.929819	7.0701813	49.987463	10	10	8
13	12	7.489343	18	-0.473977	15.01537	2.9846346	8.9080435	6	6	20
14	12	8.634239	16	0.035374	22.66961	-6.669613	44.4837352	-2	0	34
15	25	9.488537	30	1.27837	24.76691	5.2330924	27.385256	-14	0	50
16	30	13.42566	20	-0.676212	26.74945	-6.749449	45.5550554	-23	0	64
17	20	17.63256	30	0.141946	31.77451	-1.774509	3.14888352	-35	0	66
18	20	18.23347	40	-1.190505	31.04296	8.9570384	80.2285369	-39	0	80
19	20	18.68185	24	-0.351055	32.33079	-8.330793	69.4021164	-49	0	110
20	20	19.01642	50	-0.622006	32.39442	17.605584	309.956582	-59	0	124
21										
22										
23										
24										
25										
26										
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31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.029324		-0.025456	mean of the standard errors			
	std dev of the disturbance			0.893014						

			constraints		
Σ (AO-Ot)2	911.7616				
θ	0.25		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.00		>=0	<=1	
S'	14.00		>=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

HIRES ROOT BEER MODEL WKS 1 to 20 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	0.603411	4	-2.290003	4.860005	-0.860005	0.73960794	12	12	8
2	4	1.115795	4	-1.349261	6.313131	-2.313131	5.35057538	12	12	8
3	4	1.550885	8	-0.045087	8.052395	-0.052395	0.00274519	12	12	8
4	8	1.920341	10	0.369153	8.836091	1.1639093	1.35468488	12	12	12
5	8	2.837474	16	-0.169816	10.40454	5.5954553	31.3091202	8	8	18
6	12	3.616255	12	-0.889105	10.46404	1.5359631	2.35918272	8	8	26
7	10	4.880965	14	-0.724693	12.4883	1.5116958	2.28522418	6	6	28
8	6	5.653185	14	-0.627018	11.57276	2.4272357	5.89147316	12	12	26
9	6	5.705503	10	-0.757398	9.709266	0.2907338	0.08452617	18	18	28
10	4	5.749929	4	0.724461	8.85497	-4.85497	23.5707364	26	26	24
11	4	5.485947	6	-1.865115	3.025687	2.974313	8.84653758	36	36	14
12	0	5.261788	4	-1.214404	1.666804	2.3331958	5.4438027	42	42	10
13	16	4.488033	2	0.080862	0.978025	1.021975	1.04443287	46	46	10
14	18	6.207662	2	-0.26075	5.351766	-3.351766	11.234338	36	36	6
15	16	7.986567	10	-0.207699	11.34974	-1.34974	1.82179843	22	22	4
16	30	9.195415	10	0.582056	17.51436	-7.514358	56.4655828	8	8	12
17	20	12.33384	20	0.624549	23.07586	-3.075859	9.46090789	-20	0	20
18	30	13.4903	20	-2.290003	21.31777	-1.317768	1.73651228	-30	0	30
19	40	15.98084	30	-1.349261	24.74904	5.2509581	27.5725611	-50	0	40
20	24	19.60419	30	-0.045087	29.67657	0.3234291	0.10460639	-70	0	50
21										
22										
23										
24										
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26										
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28										
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30										
31										
32										
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36										
37										
38										
39										
40										
	mean of the disturbance			-0.585181		-0.013056	mean of the standard errors			
	std dev of the disturbance			0.919295						

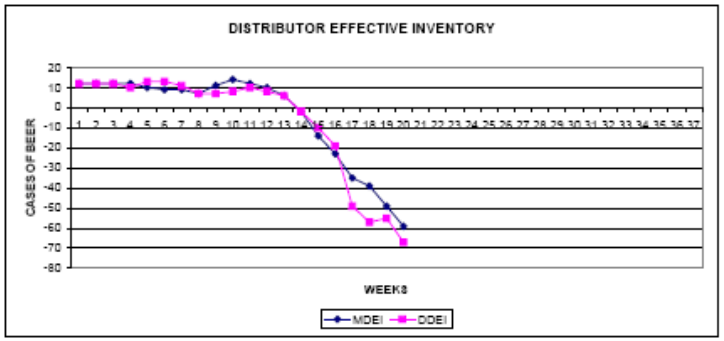
Σ (AO-Ot)2	196.676		constraints		
θ	0.15		>=0	<=1	
αs	0.30		>=0	<=1	
β	0.00		>=0	<=1	
S'	34.00		>=0	<=100	INT

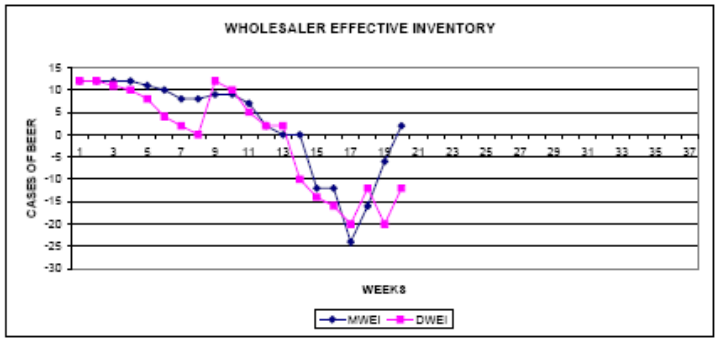
GRG NonLinear

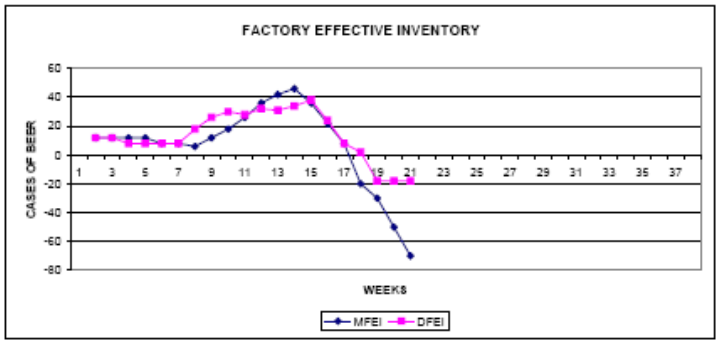
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$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

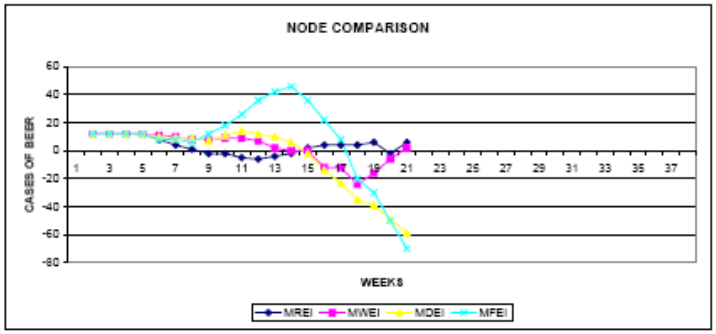
HIRES ROOT BEER MODEL WKS 1 to 20

MODEL CHARTS

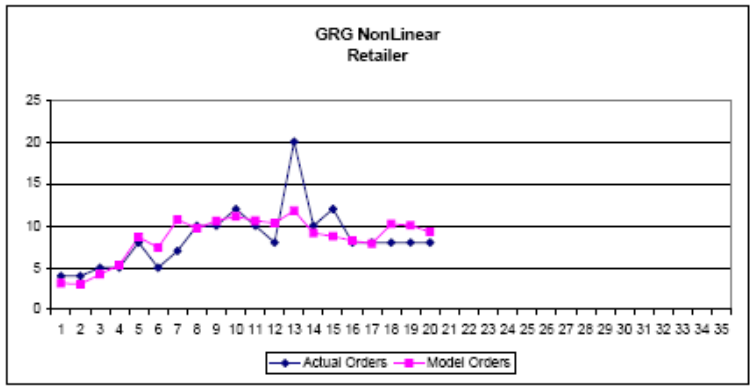


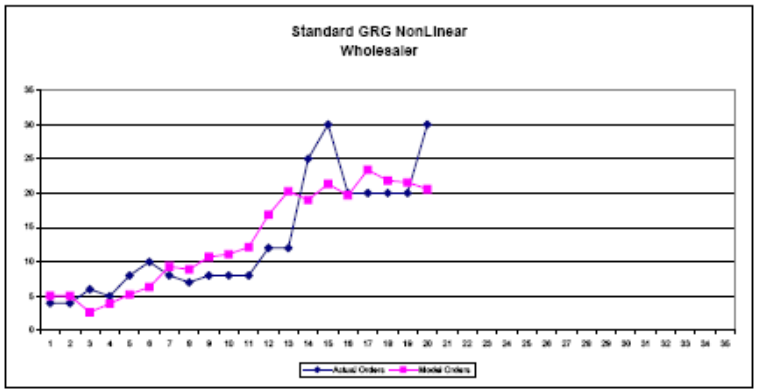


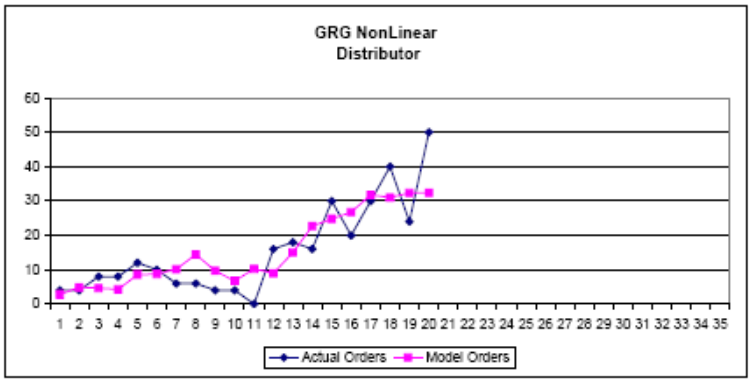


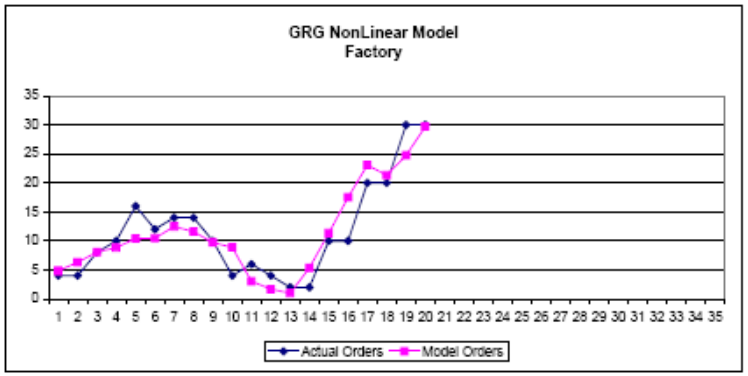


HIRES ROOT BEER MODEL WKS 1 to 20 ORDER CHARTS









HIRES ROOT BEER MODEL WKS 1 to 20 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	$ 810.50							Costs	$ 66.50						
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	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

HIRES ROOT BEER MODEL WKS 1 to 20 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	$ 127.00										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*

HIRES ROOT BEER MODEL WKS 1 to 20 MODEL WORKSHEET

STEP 5
Place and record your orders

	HIFDistributor		NO IT								HIRES ROOT BEER		Factory	NO IT		
	$ 289.00											Costs	$ 328.00			
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	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	

HIRES ROOT BEER MODEL WKS 1 to 20 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

LONESTAR 2 BEER MODEL WKS 1 to 20 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	2.666376	1.3336239	1.77856278	12	12	12
2	4	0.00	4	-0.665985	1.845974	2.1540258	4.63982708	12	12	12
3	4	0.00	4	-0.05814	2.45382	1.54618	2.39067251	12	12	12
4	4	0.00	4	0.717213	3.229172	0.7708279	0.59417568	12	12	12
5	8	0.00	12	2.171013	8.344001	3.6559991	13.3663295	8	8	12
6	8	0.00	8	-1.096223	7.971748	0.0282524	0.0007982	4	4	20
7	8	0.00	10	0.14198	12.48796	-2.487956	6.18992637	0	0	24
8	8	0.00	12	-1.662125	10.10932	1.8906828	3.57468153	-4	0	30
9	8	0.00	8	-1.008845	10.7626	-2.762596	7.63193919	0	0	30
10	8	0.00	16	-0.181543	11.5899	4.4101018	19.4489977	0	0	30
11	8	0.00	14	-0.242194	10.38018	3.6198212	13.1031055	-4	0	42
12	8	0.00	10	-0.867531	9.56333	0.4366697	0.19068041	0	0	44
13	8	0.00	8	0.047029	10.28638	-2.286379	5.2275268	0	0	46
14	8	0.00	4	-0.734036	7.866311	-3.866311	14.9483633	2	2	44
15	8	0.00	4	-0.484069	5.221295	-1.221295	1.49156242	6	6	36
16	8	0.00	4	-0.506707	2.303675	1.6963253	2.87751952	10	10	28
17	8	0.00	0	-0.986039	2.207365	-2.207365	4.87246235	10	10	24
18	8	0.00	0	1.774595	0	0	0	18	18	8
19	8	0.00	0	0.331517	1.779009	-1.779009	3.1648719	14	14	4
20	8	0.00	2	0.65131	6.142863	-4.142863	17.1632308	10	10	0
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.125218		0.0394372	mean of the standard errors			
	std dev of the disturbance			0.94365						

Σ (AO-Ot)2	122.6552		constraints		
θ	0.00		>=0	<=1	
αs	0.92		>=0	<=1	
β	0.10		>=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

LONESTAR 2 BEER MODEL WKS 1 to 20 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	2.400954	4	1.7319	5.174607	-1.174607	1.37970077	12	12	12
2	4	3.360763	4	1.399065	5.801581	-1.801581	3.24569257	12	12	12
3	4	3.744458	4	-1.25361	3.532601	0.4673993	0.21846207	12	12	12
4	4	3.897844	4	-0.254401	4.685196	-0.685196	0.46949392	12	12	12
5	4	3.959162	4	-0.247477	4.753438	-0.753438	0.5676681	12	12	12
6	12	3.983665	12	-0.455735	4.569693	7.4303074	55.2094681	12	12	12
7	8	8.795382	8	0.006949	10.96269	-2.962687	8.77751318	4	4	20
8	10	8.317963	10	-0.63034	10.40728	-0.40728	0.16587722	0	0	24
9	12	9.327586	12	1.820178	13.43407	-1.434071	2.05655997	-6	0	30
10	8	10.93167	12	1.630399	14.84838	-2.848377	8.11325393	-6	0	30
11	16	9.17197	8	0.111647	11.28102	-3.281023	10.7651148	-6	0	34
12	14	13.27042	16	-0.846729	14.56554	1.4344555	2.05786268	-12	0	32
13	10	13.70834	20	0.144824	15.70612	4.2938795	18.4374008	-14	0	36
14	8	11.48245	20	-1.35386	11.40375	8.5962521	73.8955498	-12	0	44
15	4	9.39215	8	-0.2348	9.565805	-1.565805	2.45174626	-12	0	56
16	4	6.155574	1	-2.191945	4.949884	-3.949884	15.601587	0	0	48
17	4	4.861715	4	1.103523	4.930964	-0.930964	0.86669363	16	16	29
18	0	4.344481	0	-0.520866	0.552134	-0.552134	0.30485218	32	32	13
19	0	1.736756	0	-0.846729	0	0	0	40	40	5
20	0	0.694288	0	0.144824	0	0	0	41	41	4
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
		mean of the disturbance		-0.037159		-0.006238	mean of the standard errors			
		std dev of the disturbance		1.0972						

Σ (AO-Ot)2	204.5843		constraints		
θ	0.60		>=0	<=1	
αs	0.21		>=0	<=1	
β	0.34		>=0	<=1	
S'	21.00		>=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 2 BEER MODEL WKS 1 to 20 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	1.224726	4	-0.247002	37.66745	-33.66745	1133.49742	12	12	12
2	4	2.074463	4	1.111074	39.87527	-35.87527	1287.0348	12	12	12
3	4	2.664027	100	0.265825	39.61958	60.380416	3645.79492	12	12	12
4	4	3.073077	0	-0.484326	28.79632	-28.79632	829.228177	12	12	108
5	4	3.356883	0	0.923178	30.92439	-30.92439	956.317895	12	12	104
6	4	3.553794	100	-0.225013	30.40987	69.590134	4842.7868	12	12	100
7	12	3.690414	0	0.13773	9.73734	-9.73734	94.8157858	24	24	184
8	8	6.234655	0	1.202202	20.00119	-20.00119	400.047483	18	18	178
9	10	6.77517	50	-0.069958	21.92468	28.075322	788.223689	16	16	172
10	12	7.762553	0	-0.067508	0	0	0	126	126	102
11	12	9.059981	0	1.1112	0	0	0	114	114	102
12	8	9.96016	20	-2.385819	0	20	400	154	154	50
13	16	9.359995	10	-0.473977	0	10	100	196	196	20
14	20	11.39304	20	0.035374	0	20	400	180	180	30
15	20	14.02833	10	1.27837	0	10	100	160	160	50
16	8	15.85675	10	-0.676212	0	10	100	143	143	57
17	1	13.45116	0	0.141946	0	0	0	135	135	67
18	4	9.638844	0	-1.190505	0	0	0	134	134	67
19	0	7.912335	0	-0.351055	0	0	0	130	130	67
20	0	5.489725	10	-0.622006	0	10	100	130	130	67
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.029324		3.9521957	mean of the standard errors			
	std dev of the disturbance			0.893014						

Σ (AO-Ot)2	15177.76		constraints		
θ	0.31		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.11		>=0	<=1	
S'	50.00		>=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 2 BEER MODEL WKS 1 to 20 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	3.915886	4	-2.290003	0	4	16	12	12	8
2	4	3.99823	4	-1.349261	0	4	16	12	12	8
3	4	3.999963	6	-0.045087	0	6	36	12	12	8
4	100	3.999999	6	0.369153	0	6	36	12	12	10
5	0	97.98079	120	-0.169816	87.30443	32.69557	1069.0003	-84	0	12
6	0	2.060868	0	-0.889105	0	0	0	-78	0	126
7	100	0.043347	100	-0.724693	0	100	10000	-72	0	120
8	0	97.89757	5	-0.627018	9.715983	-4.715983	22.2404977	-52	0	100
9	0	2.059118	0	-0.757398	0	0	0	-52	0	105
10	50	0.04331	0	0.724461	0	0	0	48	48	5
11	0	48.94924	0	-1.865115	44.08413	-44.08413	1943.41018	3	3	0
12	0	1.029589	0	-1.214404	0	0	0	3	3	0
13	20	0.021655	0	0.080862	0	0	0	3	3	0
14	10	19.57979	0	-0.26075	19.31904	-19.31904	373.225216	-17	0	0
15	20	10.2015	0	-0.207698	9.993797	-9.993797	99.8759835	-27	0	0
16	10	19.7939	10	0.582056	20.37596	-10.37596	107.660558	-47	0	0
17	10	10.206	10	0.624549	2.075091	7.9249094	62.8041892	-57	0	10
18	0	10.00433	1	-2.290003	0	1	1	-67	0	20
19	0	0.210425	1	-1.349261	0	1	1	-57	0	11
20	0	0.004426	1	-0.045087	0	1	1	-47	0	2
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.585181		3.7565787	mean of the standard errors			
	std dev of the disturbance			0.919295						

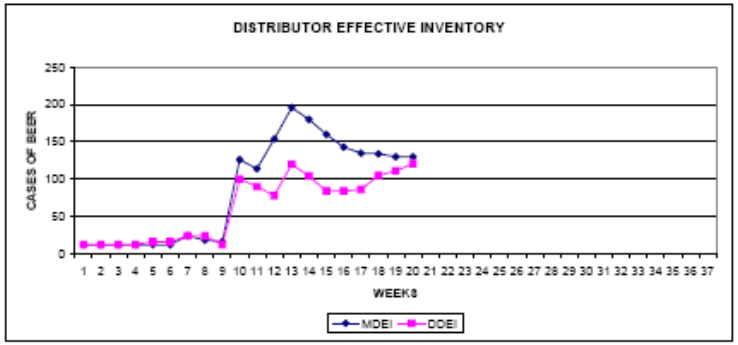
Σ (AO-Ot)2	13785.22		constraints		
θ	0.98		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.88		>=0	<=1	
S'	0.00		>=0	<=100	INT

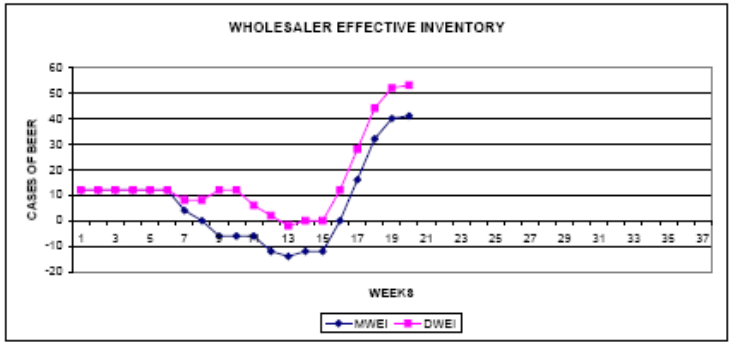
GRG NonLinear

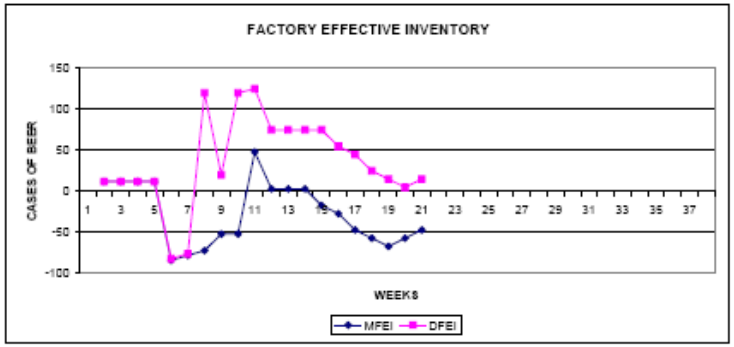
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$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

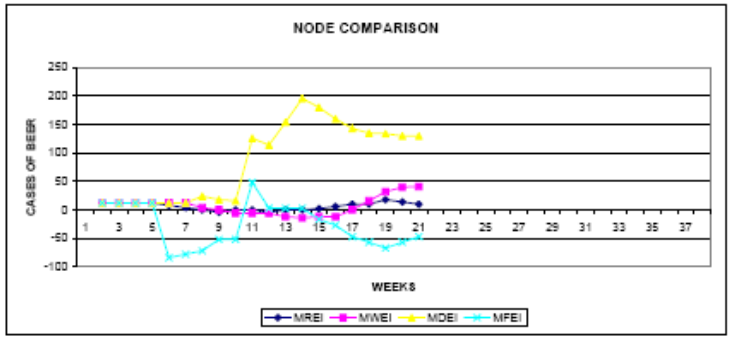
LONESTAR 2 BEER MODEL WKS 1 to 20

MODEL CHARTS

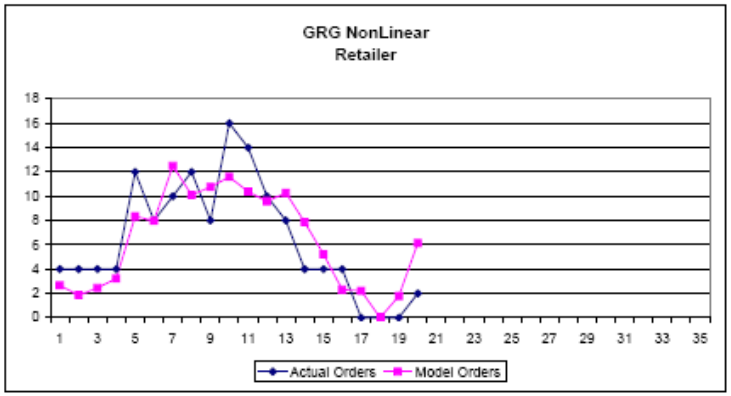


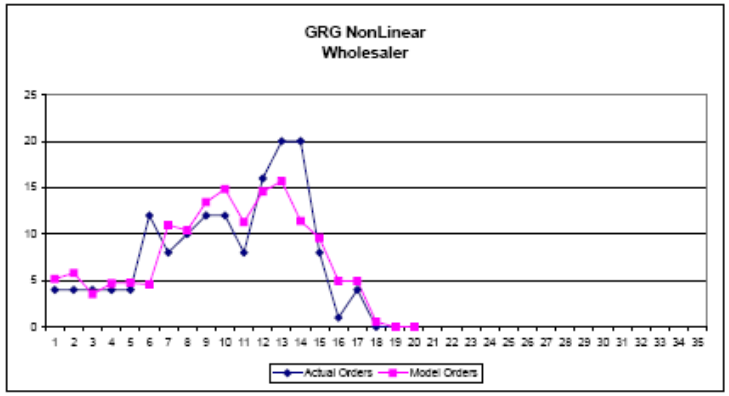


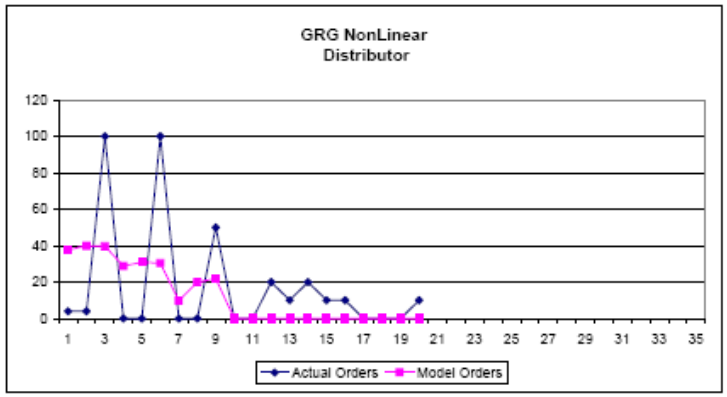


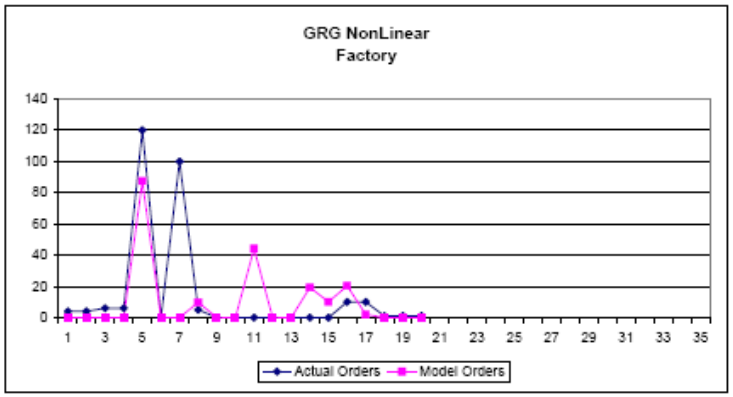


LONESTAR 2 BEER MODEL WKS 1 to 20 ORDER CHARTS









LONESTAR 2 BEER MODEL WKS 1 to 20 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	$ 1,819.00							Costs	$ 73.00						
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

LONESTAR 2 BEER MODEL WKS 1 to 20 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					LONESTAR Costs	Wholesaler $ 170.50		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	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	16	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	128	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*

LONESTAR 2 BEER MODEL WKS 1 to 20 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									LONESTAR	Factory	IT		
	$ 866.00											Costs	$ 709.50			
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	

LONESTAR 2 BEER MODEL WKS 1 to 20 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	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

LONESTAR BEER MODEL WKS 1 to 20

LONESTAR BEER MODEL WKS 1 to 20

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	3.983774	0.0162263	0.00026329	12	12	12
2	4	0.00	4	-0.665985	3.163372	0.8366282	0.69994674	12	12	12
3	4	0.00	6	-0.05814	3.771218	2.2287824	4.96747092	12	12	12
4	4	0.00	4	0.717213	4.54657	-0.54657	0.29873841	12	12	14
5	8	0.00	4	2.171013	7.702306	-3.702306	13.7070733	8	8	14
6	8	0.00	8	-1.096223	8.137007	1.8629928	3.47074227	4	4	14
7	8	0.00	6	0.14198	8.226179	-2.226179	4.95587102	2	2	16
8	8	0.00	6	-1.662125	7.273042	-1.273042	1.62063646	-2	0	18
9	8	0.00	8	-1.008845	7.926321	0.0736785	0.00542852	-6	0	20
10	8	0.00	10	-0.181543	8.753623	1.2463767	1.553456	-6	0	20
11	8	0.00	8	-0.242194	8.692973	-0.692973	0.48021123	-8	0	24
12	8	0.00	10	-0.867531	8.067636	1.9323642	3.73403158	-10	0	28
13	8	0.00	10	0.047029	8.982195	1.0178045	1.03592609	-10	0	28
14	8	0.00	10	-0.734036	8.201131	1.798869	3.23592984	-8	0	28
15	8	0.00	10	-0.484069	8.451098	1.5489024	2.39909857	-8	0	30
16	8	0.00	10	-0.506707	8.428459	1.5715405	2.46973956	-6	0	30
17	8	0.00	10	-0.986039	7.949127	2.0508727	4.20607884	-4	0	30
18	8	0.00	10	1.774595	10.70976	-0.709761	0.50376132	-2	0	30
19	8	0.00	6	0.331517	9.266684	-3.266684	10.6712253	0	0	30
20	8	0.00	6	0.65131	9.586477	-3.586477	12.8628189	-3	0	31
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
		mean of the disturbance		-0.125218		0.0090523	mean of the standard errors			
		std dev of the disturbance		0.94365						

Σ (AO-Ot)2	72.87845		constraints		
θ	0.00		>=0	<=1	
αs	0.43		>=0	<=1	
β	0.00		>=0	<=1	
S'	21.00		>=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 BEER MODEL WKS 1 to 20

LONESTAR BEER MODEL WKS 1 to 20

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	2.36903	4	1.7319	5.950797	-1.950797	3.80560839	12	12	12
2	4	3.334984	4	1.399065	6.583916	-2.583916	6.67662196	12	12	12
3	4	3.728845	6	-1.25361	4.325102	1.674898	2.80528316	12	12	12
4	6	3.889439	4	-0.254401	5.290182	-1.290182	1.66456971	12	12	14
5	4	5.139435	6	-0.247477	6.741824	-0.741824	0.55030308	10	10	14
6	4	4.464596	8	-0.455735	5.864005	2.3359949	5.45687202	10	10	16
7	8	4.189435	10	0.006949	5.462083	4.5379169	20.5926895	12	12	18
8	6	6.446271	12	-0.63034	6.886907	5.1130931	26.1437211	8	8	24
9	6	6.181964	10	1.820178	8.488949	1.5110512	2.28327588	8	8	30
10	8	6.074194	6	1.630399	7.901954	-1.901954	3.24703974	10	10	32
11	10	7.214767	6	0.111647	7.618499	-1.618499	2.61953895	12	12	28
12	8	8.864342	12	-0.846729	8.699144	3.3008562	10.895652	14	14	22
13	10	8.352429	8	0.144824	8.789337	-0.789337	0.62305277	16	16	24
14	10	9.328215	8	-1.35386	8.461163	-0.461163	0.21267117	12	12	26
15	10	9.726085	6	-0.2348	10.17281	-4.172815	17.4123847	8	8	28
16	10	9.888313	8	-2.191945	8.767344	-0.767344	0.58881647	10	10	22
17	10	9.954461	10	1.103523	12.32368	-2.323682	5.39949879	3	3	27
18	10	9.981432	8	-0.520866	10.23946	-2.239457	5.01516678	-5	0	35
19	10	9.992429	10	-0.846729	9.535146	0.464854	0.21608927	-11	0	39
20	6	9.996913	12	0.144824	10.14174	1.8582635	3.45314323	-15	0	43
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.037159		0.0027979	mean of the standard errors			
	std dev of the disturbance			1.0972						

Σ (AO-Ot)2	119.662		constraints		
θ	0.59		>=0	<=1	
αs	0.10		>=0	<=1	
β	1.00		>=0	<=1	
S'	43.00		>=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 BEER MODEL WKS 1 to 20

LONESTAR BEER MODEL WKS 1 to 20

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	0.015058	4	-0.247002	5.689691	-1.689691	2.85505596	12	12	12
2	4	0.030059	4	1.111074	7.062769	-3.062769	9.38056148	12	12	12
3	4	0.045003	6	0.265825	6.232464	-0.232464	0.05403949	12	12	12
4	6	0.059892	8	-0.484326	5.497201	2.5027986	6.26400085	12	12	14
5	4	0.082253	6	0.923178	7.06165	-1.06165	1.12710001	10	10	18
6	6	0.097001	10	-0.225013	5.928207	4.0717935	16.5795022	10	10	20
7	8	0.119223	12	0.13773	6.313171	5.6868291	32.3400248	10	10	24
8	10	0.148889	15	1.202202	7.407309	7.5926907	57.6489519	10	10	28
9	12	0.185973	2	-0.069958	6.441399	-4.441399	19.7260243	6	6	37
10	10	0.230447	2	-0.067508	6.622905	-4.622905	21.3712493	4	4	29
11	6	0.267223	2	1.1112	7.83839	-5.83839	34.0867955	4	4	21
12	6	0.288804	2	-2.385819	4.093786	-2.093786	4.38393997	8	8	13
13	12	0.310304	4	-0.473977	5.825253	-1.825253	3.33154949	11	11	6
14	8	0.354309	6	0.035374	7.051523	-1.051523	1.1057004	1	1	8
15	8	0.383091	10	1.27837	8.390592	1.6094075	2.59019261	-5	0	12
16	6	0.411784	8	-0.676212	6.464684	1.5353164	2.35719637	-11	0	20
17	8	0.432801	6	0.141946	7.303878	-1.303878	1.70009849	-13	0	24
18	10	0.461287	8	-1.190505	5.999913	2.0000866	4.00034651	-15	0	24
19	8	0.497195	8	-0.351055	6.875271	1.124729	1.26501527	-15	0	22
20	10	0.525439	8	-0.622006	6.632564	1.3674357	1.86988044	-15	0	22
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.029324		0.013369	mean of the standard errors			
	std dev of the disturbance			0.893014						

			constraints		
Σ (AO-Ot)2	224.0372				
θ	0.00		>=0	<=1	
αs	0.07		>=0	<=1	
β	0.00		>=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

LONESTAR BEER MODEL WKS 1 to 20

LONESTAR BEER MODEL WKS 1 to 20

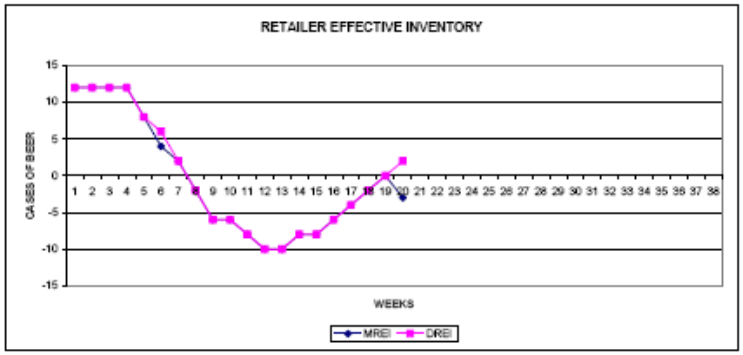
FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	0.551019	4	-2.290003	1.068831	2.9311692	8.59175294	12	12	8
2	4	1.026132	4	-1.349261	2.484688	1.5153142	2.29617711	12	12	8
3	4	1.435796	0	-0.045087	4.198523	-4.198523	17.6275988	12	12	8
4	6	1.789027	6	0.369153	7.232956	-1.232956	1.52018073	12	12	4
5	8	2.369108	8	-0.169816	7.976022	0.0239783	0.00057496	10	10	6
6	6	3.144789	10	-0.889105	10.84023	-0.840229	0.70598526	2	2	14
7	10	3.538108	10	-0.724693	9.130998	0.8690016	0.75516379	2	2	18
8	12	4.428263	10	-0.627018	10.82078	-0.820783	0.6736848	0	0	20
9	15	5.471305	12	-0.757398	11.73344	0.2665558	0.071052	-2	0	20
10	2	6.783927	15	0.724461	13.39444	1.6055555	2.57780836	-7	0	22
11	2	6.124919	6	-1.865115	6.394442	-0.394442	0.15556439	1	1	27
12	2	5.556692	0	-1.214404	0.700197	-0.700197	0.49027613	11	11	21
13	2	5.086741	0	0.080862	0	0	0	24	24	6
14	4	4.644284	0	-0.26075	0	0	0	28	28	0
15	6	4.555531	0	-0.207698	0.676964	-0.676964	0.45828004	24	24	0
16	10	4.754513	10	0.582056	7.172004	2.8279965	7.99756411	18	18	0
17	8	5.477103	10	0.624549	11.44685	-1.446855	2.09338844	8	8	10
18	6	5.824644	10	-2.290003	10.55418	-0.554178	0.30711368	0	0	20
19	8	5.8488	8	-1.349261	7.848208	0.1517922	0.02304086	4	4	20
20	8	6.145138	10	-0.045087	8.746765	1.2532346	1.57059708	6	6	18
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.585181		0.0289735	mean of the standard errors			
	std dev of the disturbance			0.919295						

Σ (AO-Ot)2	47.91582		constraints		
θ	0.14		>=0	<=1	
αs	0.92		>=0	<=1	
β	0.62		>=0	<=1	
S'	20.00		>=0	<=100	INT

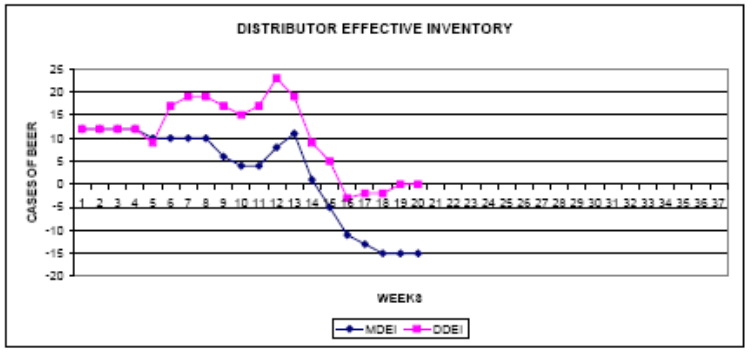
GRG NonLinear

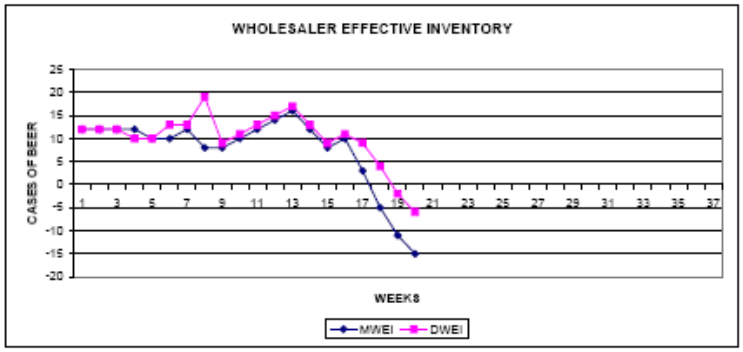
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$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

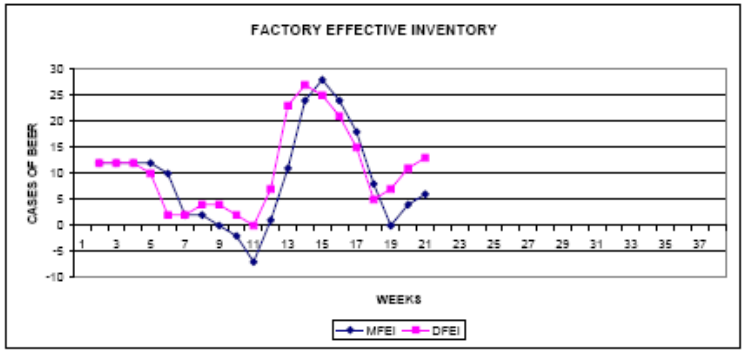
LONESTAR BEER MODEL WKS 1 to 20

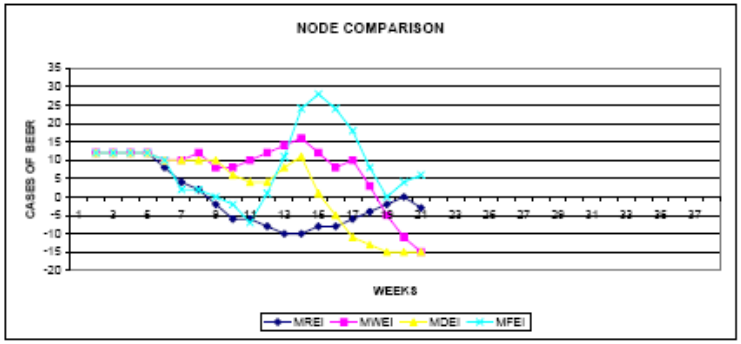


LONESTAR BEER MODEL WKS 1 to 20

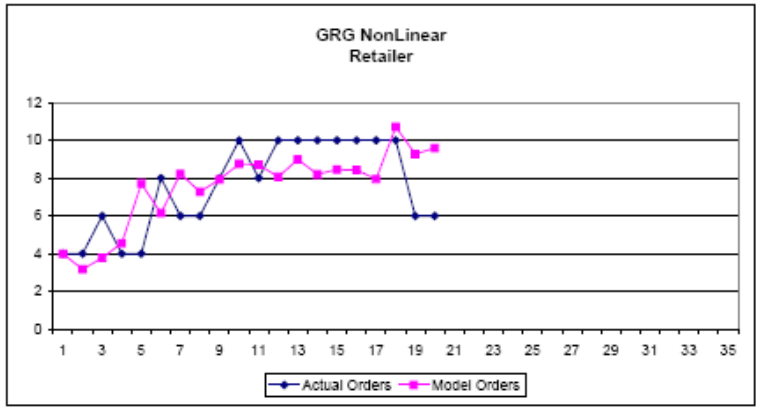


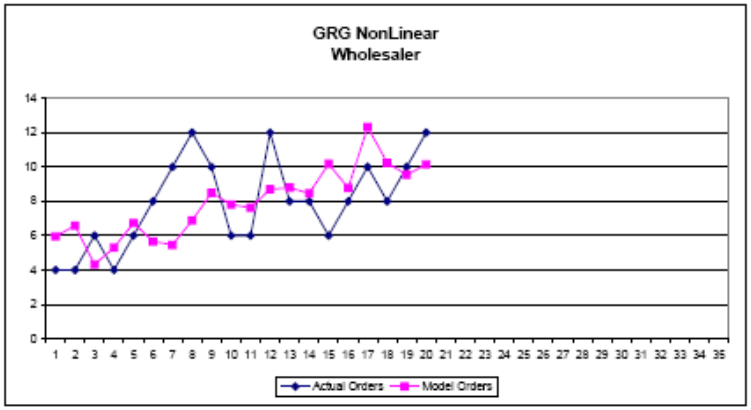


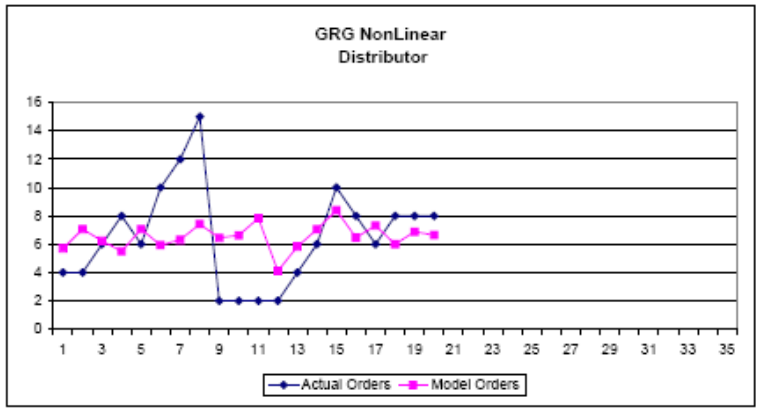


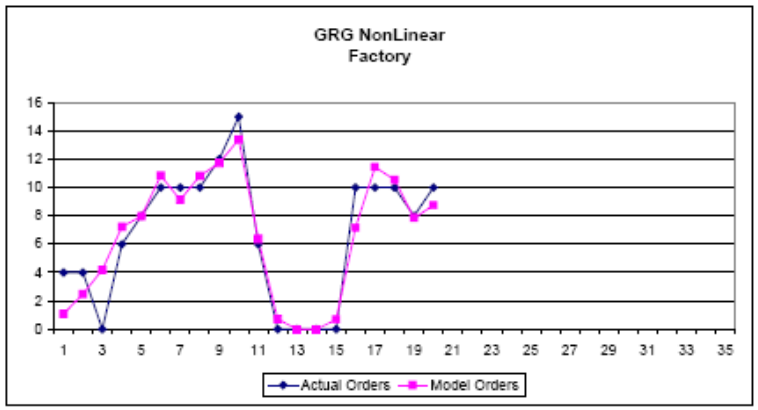


LONESTAR BEER MODEL WKS 1 to 20 ORDER CHARTS









LONESTAR BEER MODEL WKS 1 to 20

LONESTAR BEER MODEL WKS 1 to 20

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	$ 462.50							Costs	$ 104.00						
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

LONESTAR BEER MODEL WKS 1 to 20

LONESTAR BEER MODEL WKS 1 to 20

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

LONESTAR Costs | Wholesaler $ 121.50 | 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	*-5*	121.5	12	10	43		8	6	8	15	0	-15	*0*

LONESTAR BEER MODEL WKS 1 to 20

LONESTAR BEER MODEL WKS 1 to 20

STEP 5
Place and record your orders

	Distributor		IT									LONESTAR Costs	Factory	IT		
	$ 135.00												$ 102.00			
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	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	

LONESTAR BEER MODEL WKS 1 to 20

LONESTAR BEER MODEL WKS 1 to 20

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

MILLER BEER MODELWKS 1 to 20 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	2.749336	1.2506635	1.56415925	12	12	12
2	4	3.07	4	-0.685985	5.000351	-1.000351	1.0007024	12	12	12
3	4	3.78	9	-0.05814	6.321214	2.6787864	7.17589654	12	12	12
4	4	3.95	9	0.717213	7.230869	1.7691307	3.12982355	12	12	17
5	8	3.99	9	2.171013	8.813232	0.1867683	0.03488239	8	8	22
6	8	7.07	9	-1.096223	8.716469	0.2835307	0.08038968	4	4	27
7	8	7.78	9	0.14198	10.63942	-1.639421	2.68770022	5	5	27
8	8	7.95	9	-1.682125	8.970981	0.0290185	0.00084207	6	6	27
9	8	7.99	9	-1.008845	9.656554	-0.656554	0.43106316	6	6	28
10	8	8.00	9	-0.181543	10.53475	-1.534748	2.3554522	4	4	31
11	8	8.00	9	-0.242194	10.54222	-1.542216	2.37843001	1	1	35
12	8	8.00	9	-0.867531	9.862927	-0.862927	0.74484258	3	3	34
13	8	8.00	9	0.047029	10.74726	-1.747259	3.05291467	4	4	34
14	8	8.00	9	-0.734036	10.05636	-1.056357	1.11589056	0	0	39
15	8	8.00	9	-0.484069	10.30009	-1.300086	1.6902231	0	0	40
16	8	8.00	12	-0.506707	10.25247	1.7475271	3.05385111	-3	0	44
17	8	8.00	12	-0.986039	9.716945	2.2830555	5.21234241	-8	0	53
18	8	8.00	12	1.774595	12.49631	-0.496311	0.2463245	-1	0	50
19	8	8.00	12	0.331517	10.93812	1.0618791	1.12758723	4	4	49
20	8	8.00	12	0.65131	10.9438	1.0562041	1.11556715	16	16	41
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
		mean of the disturbance		-0.125218		0.0255167	mean of the standard errors			
		std dev of the disturbance		0.94365						

Σ (AO-Ot)2	38.19689		constraints		
θ	0.77		>=0	<=1	
αs	0.03		>=0	<=1	
β	0.21		>=0	<=1	
S'	100.00		>=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

MILLER BEER MODELWKS 1 to 20 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	1.7319	6.251197	-2.251197	5.06788897	12	12	12
2	4	0	4	1.399065	5.918362	-1.918362	3.68011357	12	12	12
3	4	0	6	-1.25361	3.265688	2.7343123	7.47646359	12	12	12
4	9	0	6	-0.254401	4.18478	1.8152201	3.29502414	12	12	14
5	9	0	5	-0.247477	9.111586	-4.111586	16.9051403	7	7	16
6	9	0	10	-0.455735	13.86327	-3.86327	14.9248559	2	2	17
7	9	0	15	0.006949	16.16572	-1.16572	1.35890323	-1	0	21
8	9	0	12	-0.63034	15.1679	-3.167904	10.0356171	-4	0	30
9	9	0	20	1.820178	17.33801	2.6619877	7.08617846	-8	0	37
10	9	0	18	1.630399	16.74765	1.2523523	1.56838625	-7	0	47
11	9	0	20	0.111647	14.88837	5.1316303	26.3336298	-7	0	56
12	9	0	20	-0.846729	13.26906	6.7309429	45.305592	-12	0	72
13	9	0	20	0.144824	13.77991	6.2200931	38.6895578	-13	0	84
14	9	0	20	-1.35386	11.68035	8.3196543	69.2166475	-17	0	99
15	9	0	10	-0.2348	12.11841	-2.11841	4.48786283	-23	0	116
16	9	0	10	-2.191945	10.36156	-0.361558	0.13072415	-17	0	111
17	12	0	10	1.103523	13.7772	-3.777202	14.2672529	-13	0	108
18	12	0	12	-0.520866	12.5534	-0.553398	0.30624903	-5	0	98
19	12	0	5	-0.846729	11.94713	-6.947126	48.262554	-12	0	105
20	12	0	1	0.144824	7.940141	-6.940141	48.1655578	6	6	80
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.037159		-0.115484	mean of the standard errors			
	std dev of the disturbance			1.0972						

Σ (AO-Ot)2	366.564		constraints		
θ	0.00		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.04		>=0	<=1	
S'	17.00		>=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

MILLER BEER MODELWKS 1 to 20 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	2.634869	4	-0.247002	1.928661	2.0713393	4.29044651	12	12	12
2	4	3.534105	4	1.111074	4.185972	-0.185972	0.03458572	12	12	12
3	4	3.840998	3	0.265825	3.647617	-0.647617	0.41940713	12	12	12
4	6	3.945735	5	-0.484326	3.002203	1.997797	3.99119297	12	12	11
5	6	5.298915	8	0.923178	6.6813	1.3187002	1.73897009	10	10	12
6	5	5.760732	4	-0.225013	6.913338	-2.913338	8.48753862	8	8	16
7	10	5.259625	8	0.13773	7.693386	0.3066136	0.0940119	6	6	17
8	15	8.382192	5	1.202202	14.17646	-9.176457	84.2073678	1	1	20
9	12	12.74146	3	-0.089958	17.72277	-14.72277	216.759922	-6	0	17
10	20	12.25305	15	-0.067508	17.23681	-2.236808	5.00331194	-14	0	16
11	18	17.3561	30	1.1112	23.51857	6.4814309	42.0089465	-26	0	23
12	20	17.78025	20	-2.385819	20.4457	-0.445699	0.19864725	-39	0	48
13	20	19.24244	20	-0.473977	23.81973	-3.81973	14.5903342	-56	0	65
14	20	19.74146	50	0.035374	24.8281	25.171899	633.624512	-61	0	70
15	20	19.91176	30	1.27837	26.2414	3.7585959	14.1270434	-69	0	107
16	10	19.96989	30	-0.676212	24.34494	5.6550554	31.9796518	-68	0	117
17	10	13.40255	10	0.141946	18.59577	-8.595766	73.8871853	-73	0	142
18	10	11.16123	20	-1.190505	15.022	4.9780039	24.7805229	-53	0	122
19	12	10.39631	10	-0.351055	15.09662	-5.096623	25.9745439	-33	0	112
20	5	11.45269	10	-0.622006	13.58592	-3.58592	12.8588225	5	5	72
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.029324		0.0156419	mean of the standard errors			
	std dev of the disturbance			0.893014						

Σ (AO-Ot)2	1199.057		constraints		
θ	0.66		>=0	<=1	
αs	0.46		>=0	<=1	
β	0.00		>=0	<=1	
S'	11.00		>=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

MILLER BEER MODELWKS 1 to 20 FME - GRG NonLinear

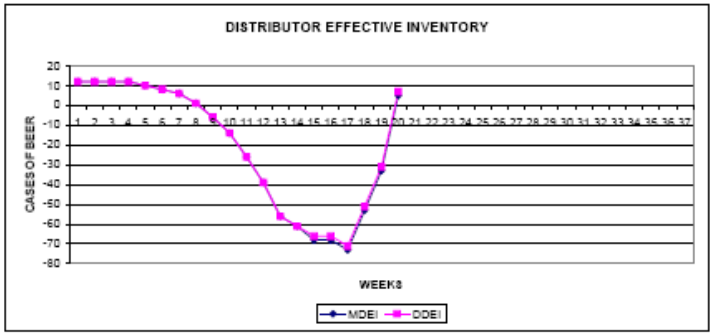
FACTORY	incoming orders	expected incoming orders	actual orders	disturb-ance	model orders	error term	squared errors	effective inventory	Stock	Supply line
WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	$(AO-Ot)^2$	EI	S_t	SL_t
0	4	0								
1	4	4	4	-2.290003	8.415683	-4.415683	19.4982533	12	12	8
2	4	4	4	-1.349261	9.356424	-5.356424	28.6912834	12	12	8
3	4	4	5	-0.045087	10.6606	-5.660598	32.0423693	12	12	8
4	3	4	4	0.369153	11.07484	-7.074839	50.0533408	12	12	9
5	5	3	3	-0.169816	9.459868	-6.459868	41.727316	13	13	9
6	8	5	5	-0.889105	10.74038	-5.74038	32.9519586	13	13	7
7	4	8	10	-0.724693	14.2096	-4.209595	17.720892	9	9	8
8	8	4	5	-0.627018	10.38347	-5.383472	28.9817659	8	8	15
9	5	8	10	-0.757398	14.48169	-4.481694	20.0856795	5	5	15
10	3	5	6	0.724461	12.58255	-6.582548	43.3299384	10	10	15
11	15	3	20	-1.865115	7.84057	12.15943	147.851738	12	12	16
12	30	15	5	-1.214404	20.87229	-15.87229	251.929481	7	7	26
13	20	30	30	0.080862	37.70096	-7.700959	59.3047751	-17	0	25
14	20	20	30	-0.26075	27.35935	2.6406531	6.97304971	-17	0	35
15	50	20	50	-0.207698	27.4124	22.587601	510.19973	-32	0	60
16	30	50	100	0.582056	58.20215	41.797847	1747.05999	-52	0	80
17	30	30	30	0.624549	38.24465	-8.244646	67.9741821	-52	0	150
18	10	30	30	-2.290003	35.33009	-5.330094	28.4099051	-32	0	130
19	20	10	32	-1.349261	11.85118	20.14882	405.974951	58	58	60
20	10	20	20	-0.045087	22.39334	-2.393344	5.72809404	68	68	62
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.585181		0.2214061	mean of the standard errors			
	std dev of the disturbance			0.919295						

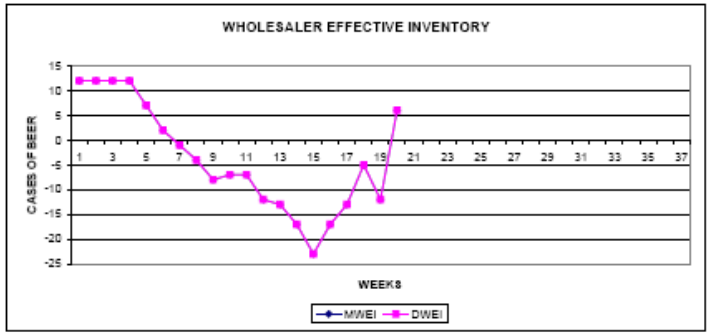
Σ (AO-Ot)2	3546.486		constraints		
θ	1.00		>=0	<=1	
αs	0.08		>=0	<=1	
β	0.00		>=0	<=1	
S'	100.00		>=0	<=100	INT
	GRG NonLinear				

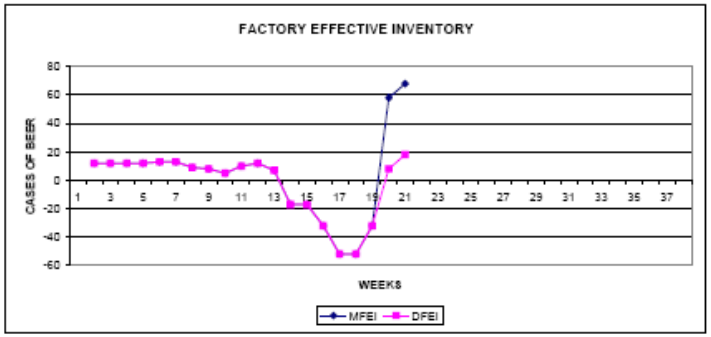
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$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

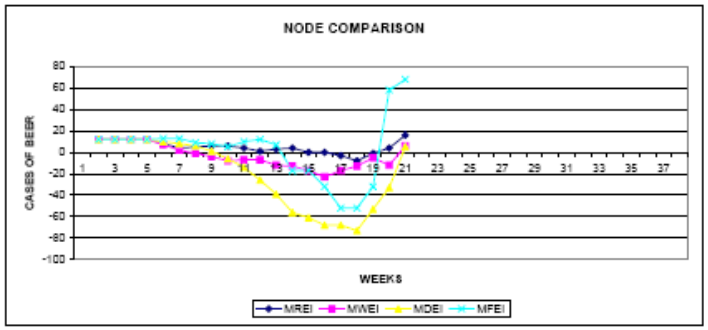
MILLER BEER MODELWKS 1 to 20

MODEL CHARTS

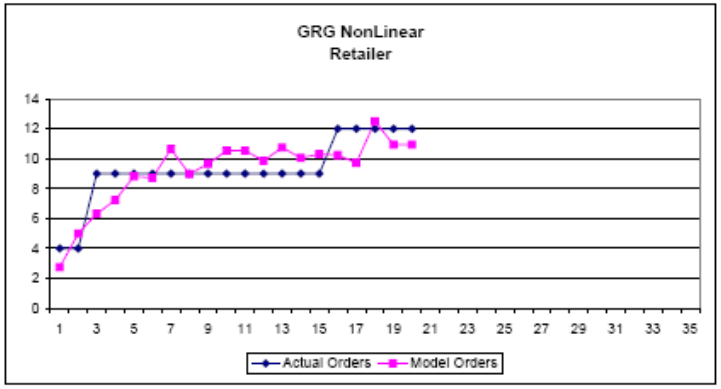


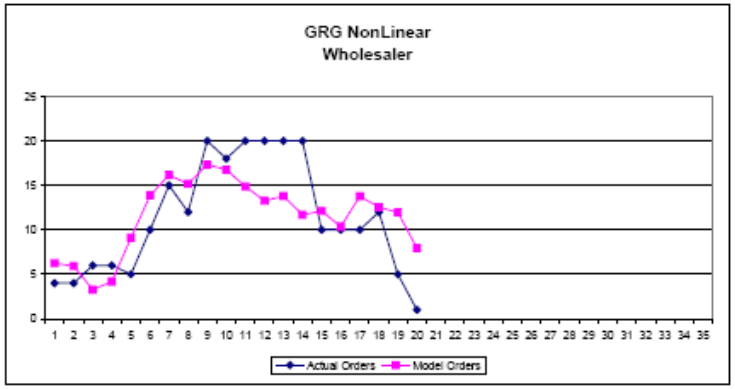


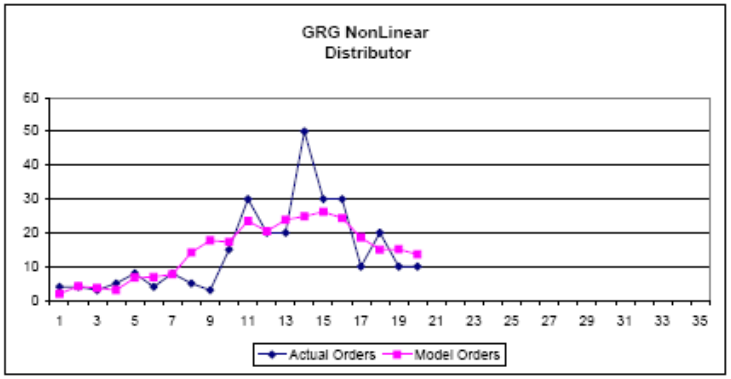


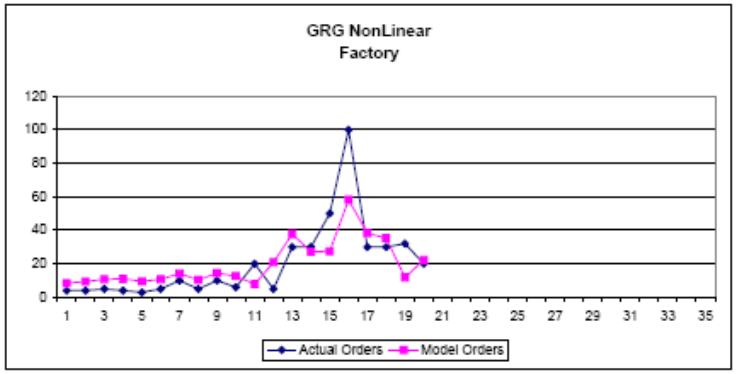


MILLER BEER MODELWKS 1 to 20 ORDER CHARTS









MILLER BEER MODELWKS 1 to 20 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	$ 1,100.50							Costs	$ 66.50						
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

MILLER BEER MODELWKS 1 to 20 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					MILLER Costs	Wholesaler $ 170.50		IT									MILLER 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*

MILLER BEER MODELWKS 1 to 20 MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		IT									MILLER	Factory	IT	
	$ 536.00											Costs	$ 327.50		
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	68	68	*8*	293.5	32	60
20	536	10	10	72		88	30	32	0	68	68	*18*	327.5	20	62

MILLER BEER MODELWKS 1 to 20 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

NAPOLY BEER MODEL WKS 1 to 20 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	4.718951	-0.718951	0.51689025	12	12	12
2	4	0.16	4	-0.665985	4.058752	-0.058752	0.00345177	12	12	12
3	4	0.31	4	-0.05814	4.820384	-0.820384	0.67303007	12	12	12
4	4	0.46	7	0.717213	5.743363	1.2566365	1.5791354	12	12	12
5	8	0.60	7	2.171013	8.388312	-1.388312	1.92741142	8	8	15
6	8	0.90	10	-1.096223	6.466752	3.5332477	12.4838393	4	4	18
7	8	1.18	15	0.14198	8.621007	6.3789934	40.6915571	0	0	24
8	8	1.46	5	-1.662125	5.975863	-0.975863	0.95230892	-1	0	32
9	8	1.72	8	-1.008845	7.169703	0.8302968	0.68939271	-2	0	30
10	8	1.97	6	-0.181543	8.52707	-2.52707	6.38608456	0	0	28
11	8	2.21	4	-0.242194	8.429397	-4.429397	19.619557	-4	0	30
12	8	2.44	2	-0.867531	8.592885	-6.592885	43.4661347	-4	0	26
13	8	2.67	4	0.047029	10.56549	-6.565492	43.1056909	-4	0	20
14	8	2.88	8	-0.734036	9.998043	-1.998043	3.99217753	-8	0	20
15	8	3.09	8	-0.484069	9.896057	-1.896057	3.59503161	-12	0	24
16	8	3.28	19	-0.506707	9.652506	9.347494	87.3756432	-15	0	27
17	8	3.47	20	-0.986039	7.691098	12.308902	151.509077	-16	0	39
18	8	3.65	2	1.774595	8.126568	-6.126568	37.5348328	-22	0	57
19	8	3.83	8	0.331517	7.275381	0.7246194	0.52507335	-25	0	54
20	8	3.99	8	0.65131	8.319343	-0.319343	0.10197976	-21	0	50
21										
22										
23										
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40										
	mean of the disturbance			-0.125218		-0.001846	mean of the standard errors			
	std dev of the disturbance			0.94365						

Σ (AO-Ot)2	458.7283		constraints		
θ	0.04		>=0	<=1	
αs	0.37		>=0	<=1	
β	0.38		>=0	<=1	
S'	29.00		>=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

NAPOLY BEER MODEL WKS 1 to 20 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	2.785243	4	1.7319	4.517143	-0.517143	0.26743696	12	12	12
2	4	3.631092	4	1.399065	5.030156	-1.030156	1.06122185	12	12	12
3	4	3.887967	4	-1.25361	2.634357	1.3656434	1.86498177	12	12	12
4	4	3.965977	4	-0.254401	3.711576	0.288424	0.08318843	12	12	12
5	7	3.989687	4	-0.247477	3.74219	0.2578099	0.06646595	12	12	12
6	7	6.085795	8	-0.455735	6.945415	1.054585	1.11214961	9	9	12
7	10	6.722366	8	0.006949	9.360025	-1.360025	1.84966851	6	6	16
8	15	9.004618	12	-0.63034	13.6357	-1.635699	2.67551004	0	0	20
9	5	13.17927	20	1.820178	20.26087	-0.260866	0.06805108	-11	0	28
10	8	7.483955	18	1.630399	14.37577	3.6242262	13.1350157	-8	0	40
11	6	7.843283	10	0.111647	13.21635	-3.21635	10.3449103	-8	0	50
12	4	6.559785	10	-0.846729	10.97448	-0.974477	0.9496048	-10	0	56
13	2	4.777379	10	0.144824	10.18362	-0.183623	0.03371734	-10	0	62
14	4	2.84346	8	-1.35386	6.75102	1.2489795	1.55994984	-7	0	67
15	8	3.648771	6	-0.2348	8.675392	-2.675392	7.15772115	-4	0	68
16	8	6.678579	11	-2.191945	9.748054	1.2519456	1.56736767	-10	0	72
17	19	7.598699	16	1.103523	13.96364	2.0363577	4.1467525	-13	0	78
18	20	15.53755	20	-0.520866	20.2781	-0.278103	0.07734123	-20	0	82
19	2	18.6448	25	-0.846729	23.05949	1.9405082	3.76556428	-28	0	90
20	8	7.054846	12	0.144824	12.46109	-0.461089	0.21260348	-5	0	90
21										
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	mean of the disturbance			-0.037159		0.0237777	mean of the standard errors			
	std dev of the disturbance			1.0972						

Σ (AO-Ot)2	51.99922		constraints		
θ	0.70		>=0	<=1	
αs	0.44		>=0	<=1	
β	0.00		>=0	<=1	
S'	12.00		>=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

NAPOLY BEER MODEL WKS 1 to 20 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	1.462791	4	-0.247002	0.722313	3.2776875	10.7432353	12	12	12
2	4	2.390642	4	1.111074	3.00824	0.9917596	0.98358706	12	12	12
3	4	2.97918	2	0.265825	2.75153	-0.75153	0.56479671	12	12	12
4	4	3.352492	4	-0.484326	2.456936	1.5430641	2.38104679	12	12	10
5	4	3.589284	2	0.923178	4.101233	-2.101233	4.41517844	12	12	10
6	4	3.739482	4	-0.225013	3.185485	0.8145148	0.66343444	12	12	8
7	8	3.834753	4	0.13773	4.668099	-0.668099	0.44635685	10	10	10
8	8	5.357974	5	1.202202	9.469485	-4.469485	19.9762962	6	6	10
9	12	6.324157	15	-0.069958	12.36068	2.6393215	6.96601795	0	0	13
10	20	8.399799	10	-0.067508	13.98842	-3.988418	15.8915314	-8	0	24
11	18	12.64197	14	1.1112	19.16055	-5.160555	26.6313231	-24	0	30
12	10	14.60139	24	-2.385819	17.25285	6.7471508	45.5240437	-37	0	39
13	10	12.91867	20	-0.473977	16.78288	3.2171155	10.3498324	-40	0	56
14	10	11.85132	20	0.035374	15.48467	4.5153285	20.3881912	-48	0	74
15	8	11.1743	25	1.27837	15.4338	9.5661997	91.5121764	-53	0	89
16	6	10.01346	5	-0.676212	11.78379	-6.783787	46.019763	-49	0	102
17	11	8.545749	5	0.141946	11.42209	-6.422092	41.2432595	-43	0	95
18	16	9.443263	13	-1.190505	11.80961	1.1903865	1.41702001	-29	0	75
19	20	11.84105	20	-0.351055	15.12909	4.8709077	23.7257416	-30	0	73
20	25	14.82476	10	-0.622006	18.04747	-8.047467	64.7617194	-25	0	68
21										
22										
23										
24										
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40										
	mean of the disturbance			-0.029324		0.0491386	mean of the standard errors			
	std dev of the disturbance			0.893014						

Σ (AO-Ot)2	434.6046		constraints		
θ	0.37		>=0	<=1	
αs	0.55		>=0	<=1	
β	0.07		>=0	<=1	
S'	12.00		>=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

NAPOLY BEER MODEL WKS 1 to 20 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	1.847621	4	-2.290003	0	4	16	12	12	8
2	4	2.841816	0	-1.349261	0.344625	-0.344625	0.11876651	12	12	8
3	4	3.376787	4	-0.045087	2.269555	1.730445	2.99443999	12	12	4
4	2	3.664652	4	0.369153	2.971661	1.0283392	1.05748153	12	12	4
5	4	2.895741	0	-0.169816	2.554355	-2.554355	6.52472773	10	10	8
6	2	3.405804	4	-0.889105	2.430914	1.5690859	2.46203049	10	10	4
7	4	2.756456	2	-0.724693	0.969618	1.0303822	1.06168754	12	12	4
8	4	3.330855	2	-0.627018	3.55152	-1.55152	2.40721404	8	8	6
9	5	3.639937	2	-0.757398	3.773113	-1.773113	3.14393061	8	8	4
10	15	4.268157	5	0.724461	7.347732	-2.347732	5.51184759	5	5	4
11	10	9.225251	12	-1.865115	12.09181	-0.091812	0.00842937	-8	0	7
12	14	9.583112	12	-1.214404	12.88592	-0.885921	0.78485585	-16	0	17
13	24	11.6233	25	0.080862	16.07125	8.9287533	79.7226357	-25	0	24
14	20	17.34016	15	-0.26075	21.1677	-6.167697	38.0404874	-37	0	37
15	20	18.56875	25	-0.207698	22.385	2.6149959	6.8382038	-45	0	40
16	25	19.22985	25	0.582056	23.83586	1.1641414	1.35522527	-40	0	40
17	5	21.89511	25	0.624549	26.32915	-1.329149	1.76663643	-50	0	50
18	5	14.09117	20	-2.290003	15.61066	4.3893444	19.2663444	-30	0	50
19	13	9.891913	10	-1.349261	12.45937	-2.459369	6.04849367	-10	0	45
20	20	11.32755	10	-0.045087	14.54462	-4.544618	20.6526455	2	2	30
21										
22										
23										
24										
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26										
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31										
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36										
37										
38										
39										
40										
	mean of the disturbance			-0.585181		0.1202838	mean of the standard errors			
	std dev of the disturbance			0.919295						

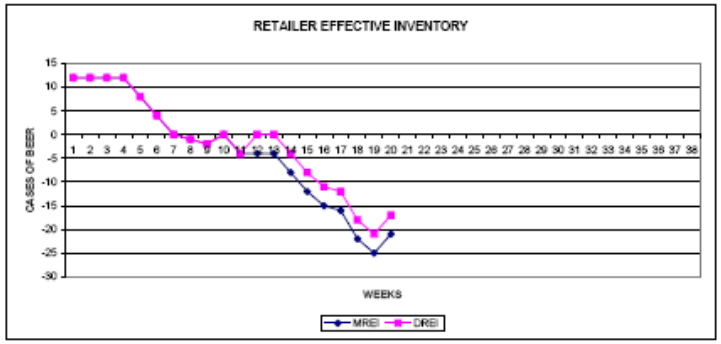
Σ (AO-Ot)2	215.7681		constraints		
θ	0.46		>=0	<=1	
αs	0.49		>=0	<=1	
β	0.04		>=0	<=1	
S'	10.00		>=0	<=100	INT

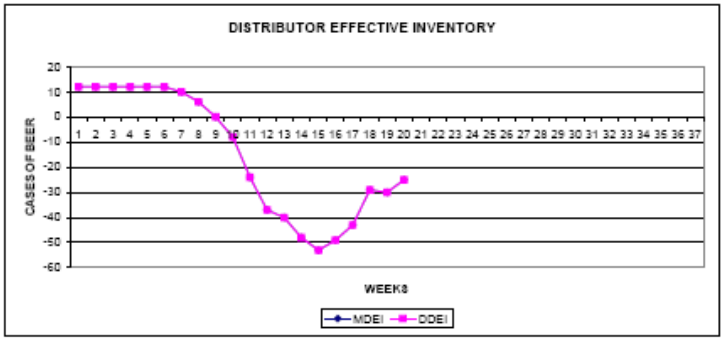
GRG NonLinear

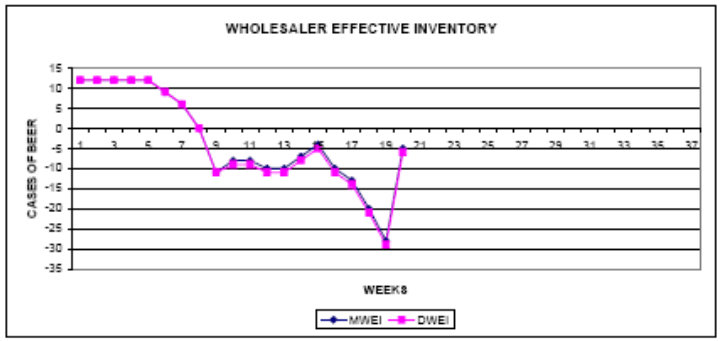
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0,eIO+\alpha s(s'-S_t-\beta SL_t)+\varepsilon$
Error Term:
$AO - O_t$
Squared errors: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

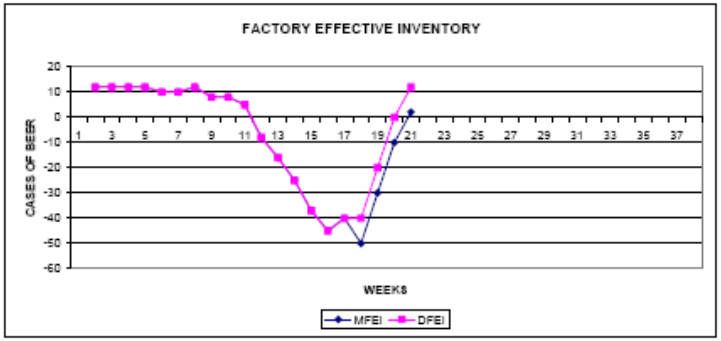
NAPOLY BEER MODEL WKS 1 to 20

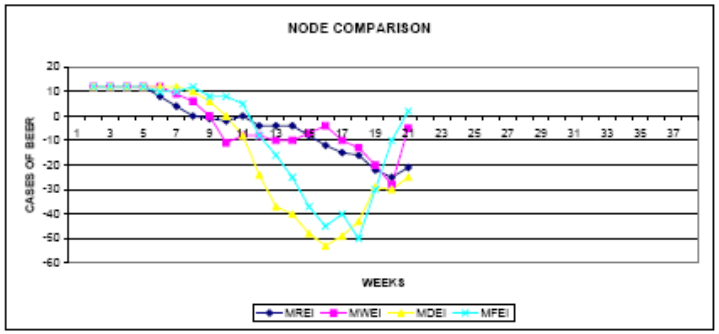
MODEL CHARTS





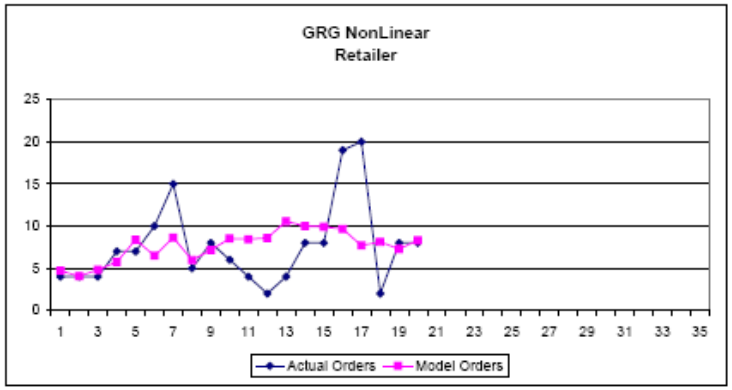


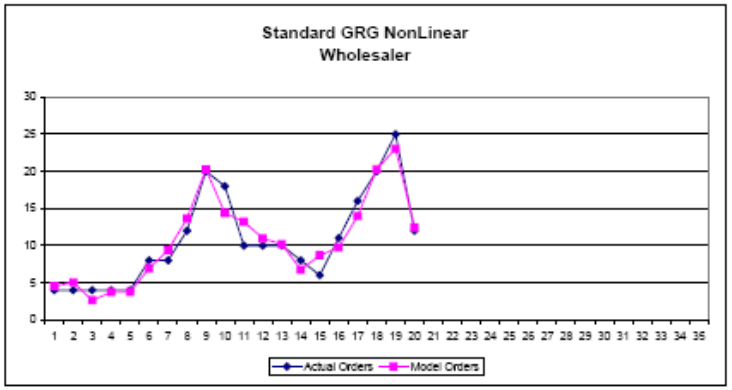


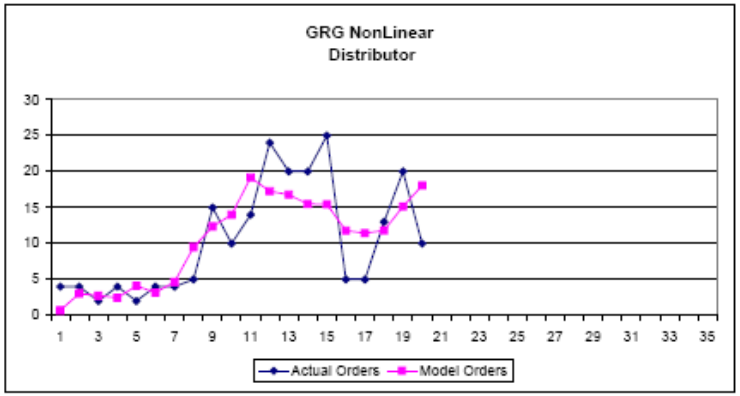


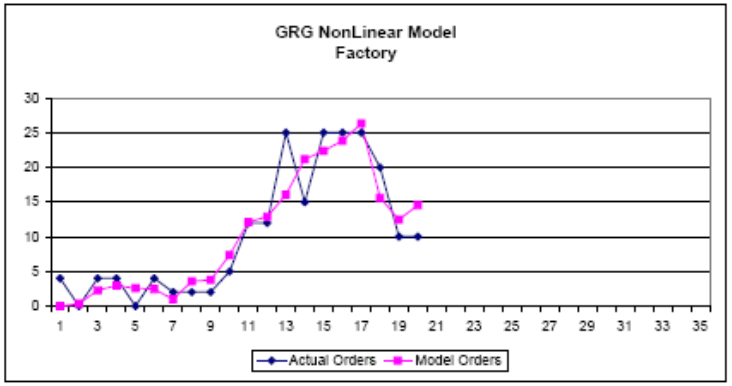
NAPOLY BEER MODEL WKS 1 to 20

ORDER CHARTS









NAPOLY BEER MODEL WKS 1 to 20 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	$ 1,078.00							Costs	$ 164.00						
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	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

NAPOLY BEER MODEL WKS 1 to 20 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

NAPOLY Costs | Wholesaler $ 171.50 | 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	8	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*

NAPOLY BEER MODEL WKS 1 to 20

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		No IT									NAPOLY	Factory			
	$ 430.00											Costs	$ 312.50			
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	

NAPOLY BEER MODEL WKS 1 to 20 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

NORTHEAST MODEL WKS 1 to 20 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	3.926714	0.0732856	0.00537078	12	12	12
2	4	0.19	4	-0.665985	3.30024	0.6997597	0.48966365	12	12	12
3	4	0.38	4	-0.05814	4.092612	-0.092612	0.00857696	12	12	12
4	4	0.55	4	0.717213	5.043544	-1.043544	1.08898316	12	12	12
5	8	0.72	8	2.171013	8.340988	-0.340988	0.11627272	8	8	12
6	8	1.07	8	-1.096223	7.103224	0.8967759	0.80420706	4	4	16
7	8	1.41	12	0.14198	10.35379	1.6462098	2.71000667	0	0	20
8	8	1.73	16	-1.662125	8.869192	7.1308078	50.8484201	-4	0	28
9	8	2.03	8	-1.008845	9.826488	-1.826488	3.33605755	-4	0	36
10	8	2.32	8	-0.181543	10.94307	-2.943067	8.6616406	-4	0	36
11	8	2.60	8	-0.242194	11.15767	-3.157668	9.97086917	-4	0	36
12	8	2.86	8	-0.867531	10.79424	-2.794239	7.80777067	-8	0	40
13	8	3.11	10	0.047029	11.95801	-1.958008	3.83379639	-12	0	44
14	8	3.35	8	-0.734036	11.41407	-3.414071	11.6558834	-12	0	46
15	8	3.57	8	-0.484069	11.88967	-3.889669	15.1295261	-12	0	46
16	8	3.79	10	-0.506707	12.08172	-2.081723	4.33357125	-11	0	45
17	8	3.99	10	-0.986039	11.80667	-1.806674	3.2640723	-11	0	47
18	8	4.19	11	1.774595	14.76169	-3.761688	14.1502959	-14	0	52
19	8	4.37	19	0.331517	13.50357	5.4964339	30.210786	-14	0	55
20	8	4.55	27	0.65131	13.99935	13.000653	169.016969	-14	0	66
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.125218		-0.008326	mean of the standard errors			
	std dev of the disturbance			0.94365						

Σ (AO-Ot)2	337.4427				
θ	0.05		constraints		
αs	0.42		>=0	<=1	
β	0.00		>=0	<=1	
S'	21.00		>=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

NORTHEAST MODEL WKS 1 to 20 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	2.101194	4	-0.247002	1.062414	2.9375863	8.62941308	12	12	12
2	4	3.098634	4	1.111074	3.41793	0.5820699	0.33880537	12	12	12
3	4	3.57212	4	0.265825	3.046167	0.9538329	0.90979722	12	12	12
4	4	3.796885	4	-0.484326	2.520781	1.4792192	2.18808947	12	12	12
5	4	3.903581	4	0.923178	4.034981	-0.034981	0.00122369	12	12	12
6	4	3.95423	4	-0.225013	2.937439	1.0625611	1.12903618	12	12	12
7	4	3.978273	4	0.13773	3.324225	0.6757752	0.45667206	12	12	12
8	4	3.989686	5	1.202202	4.40011	0.5998902	0.3598683	12	12	12
9	8	3.995104	8	-0.069958	3.100377	4.8996227	24.0063025	12	12	13
10	8	6.09887	5	-0.067508	5.206593	-0.206593	0.04268079	8	8	17
11	12	7.097531	8	1.1112	7.482934	0.5170656	0.26735684	4	4	18
12	12	9.67279	8	-2.385819	6.594166	1.4058343	1.97637005	-3	0	21
13	15	10.89527	10	-0.473977	9.728487	0.2715129	0.07371926	-7	0	21
14	10	13.05148	10	0.035374	12.22909	-2.229093	4.96885602	-17	0	26
15	5	11.44854	10	1.27837	11.80317	-1.803171	3.2514255	-19	0	28
16	9	8.061132	4	-0.676212	6.395198	-2.395198	5.73697364	-16	0	30
17	0	8.554318	4	0.141946	7.904486	-3.904486	15.2450137	-15	0	24
18	0	4.060748	0	-1.190505	2.276409	-2.276409	5.18203894	-5	0	18
19	15	1.927643	0	-0.351055	1.147708	-1.147708	1.31723375	5	5	8
20	10	8.794533	0	-0.622006	8.040564	-8.040564	64.6506648	-6	0	4
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.029324		-0.332662	mean of the standard errors			
	std dev of the disturbance			0.893014						

Σ (AO-Ot)2	140.7315		constraints		
θ	0.53		>=0	<=1	
αs	0.03		>=0	<=1	
β	1.00		>=0	<=1	
S'	0.00		>=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

NORTHEAST MODEL WKS 1 to 20 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	1.215761	4	1.7319	3.896845	0.1031546	0.01064087	12	12	12
2	4	2.062003	4	1.399065	4.410253	-0.410253	0.16830717	12	12	12
3	4	2.651038	4	-1.25361	2.346613	1.6533867	2.73368768	12	12	12
4	4	3.061042	4	-0.254401	3.755826	0.2441738	0.05962085	12	12	12
5	4	3.346429	4	-0.247477	4.048137	-0.048137	0.00231713	12	12	12
6	8	3.545075	4	-0.456735	4.038526	-0.038526	0.00148423	12	12	12
7	8	4.899106	4	0.006949	6.479597	-2.479597	6.14840151	8	8	12
8	12	5.841592	8	-0.63034	7.409151	0.590849	0.34910251	4	4	12
9	16	7.71338	8	1.820178	11.73567	-3.735673	13.955253	-4	0	16
10	8	10.23202	12	1.630399	13.44439	-1.44439	2.08626372	-16	0	20
11	8	9.553617	12	0.111647	10.00696	1.9930405	3.97221063	-20	0	28
12	8	9.08141	16	-0.846729	7.956237	7.0437633	49.614602	-20	0	32
13	8	8.752726	10	0.144824	7.53386	2.4661404	6.0818486	-20	0	39
14	10	8.523943	5	-1.35386	5.651358	-0.651358	0.42426662	-19	0	40
15	8	8.972576	9	-0.2348	7.684156	1.3158445	1.73144667	-21	0	37
16	8	8.676971	0	-2.191945	4.811265	-4.811265	23.1482751	-24	0	41
17	10	8.471212	0	1.103523	9.141255	-9.141255	83.5625464	-24	0	33
18	10	8.935872	15	-0.520866	9.221806	5.7781939	33.3875249	-26	0	25
19	11	9.259303	10	-0.846729	8.4442	1.5558003	2.42051451	-26	0	30
20	19	9.788371	10	0.144824	9.96482	0.0351805	0.00123767	-27	0	30
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.037159		0.0009537	mean of the standard errors			
	std dev of the disturbance			1.0972						

Σ (AO-Ot)2	229.8698		constraints		
θ	0.30		>=0	<=1	
αs	0.16		>=0	<=1	
β	0.99		>=0	<=1	
S'	30.00		>=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

NORTHEAST MODEL WKS 1 to 20 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	0.88643	4	-2.290003	7.596427	-3.596427	12.9342884	12	12	8
2	4	1.57642	4	-1.349261	9.227159	-5.227159	27.3231951	12	12	8
3	4	2.113504	8	-0.045087	11.06842	-3.068416	9.41517794	12	12	8
4	4	2.531565	4	0.369153	11.90072	-7.900718	62.4213525	12	12	12
5	4	2.856981	8	-0.169816	11.68717	-3.687165	13.5951885	12	12	12
6	4	3.110283	4	-0.889105	7.221178	-3.221178	10.3759883	16	16	12
7	4	3.307451	0	-0.724693	7.582758	-7.582758	57.4982152	16	16	12
8	4	3.460925	4	-0.627018	3.833907	0.1660928	0.02758682	20	20	4
9	5	3.580388	0	-0.757398	3.82299	-3.82299	14.6152497	20	20	4
10	8	3.894985	15	0.724461	10.61945	4.3805547	19.1892595	15	15	4
11	5	4.804687	15	-1.865115	12.93957	2.0604287	4.24536663	11	11	15
12	8	4.847969	50	-1.214404	18.63357	31.366434	983.853189	6	6	30
13	8	5.546483	10	0.080862	13.62735	-3.627345	13.1576343	13	13	65
14	10	6.090201	10	-0.26075	6.829451	3.1705494	10.0523836	20	20	60
15	10	6.956641	0	-0.207698	0	0	0	60	60	20
16	10	7.631072	0	0.582056	0	0	0	60	60	10
17	4	8.156044	0	0.624549	0	0	0	60	60	0
18	4	7.235034	0	-2.290003	0	0	0	56	56	0
19	0	6.518126	0	-1.349261	0	0	0	52	52	0
20	0	5.073661	0	-0.045087	0	0	0	52	52	0
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.585181		-0.029505	mean of the standard errors			
	std dev of the disturbance			0.919295						

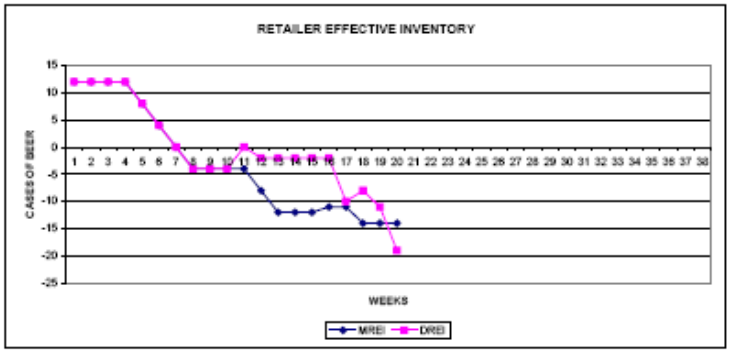
Σ (AO-Ot)2	1238.704		constraints		
θ	0.22		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.00		>=0	<=1	
S'	21.00		>=0		INT

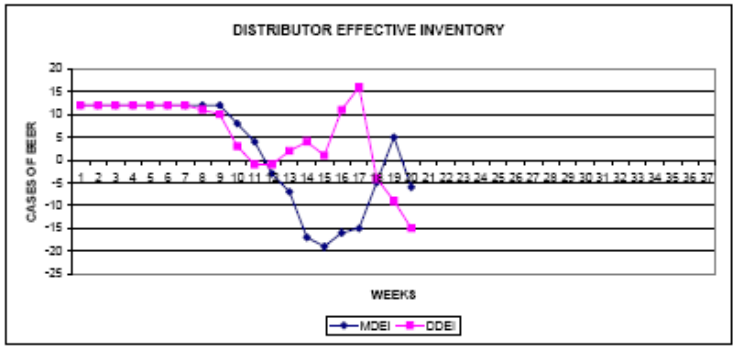
GRG NonLinear

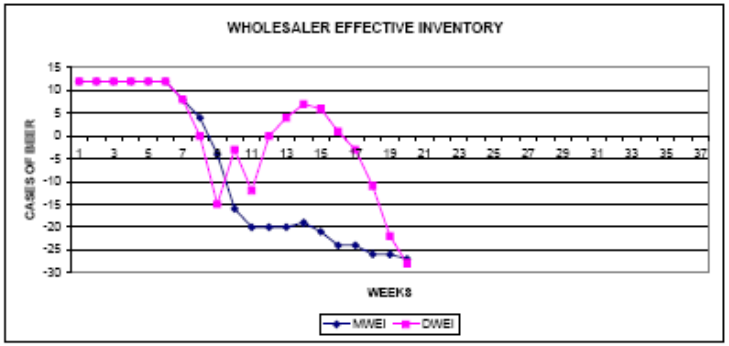
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$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

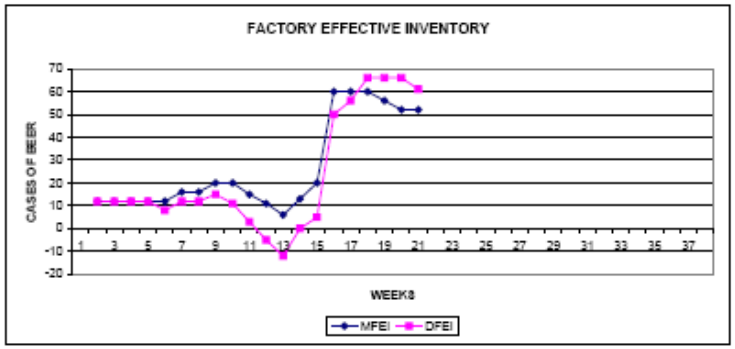
NORTHEAST MODEL WKS 1 to 20

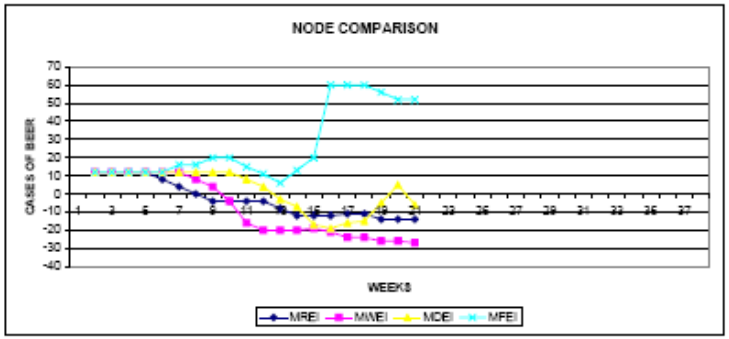
MODEL CHARTS





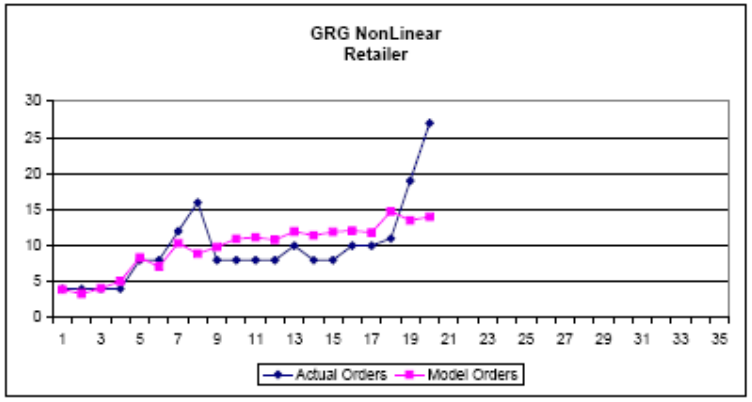


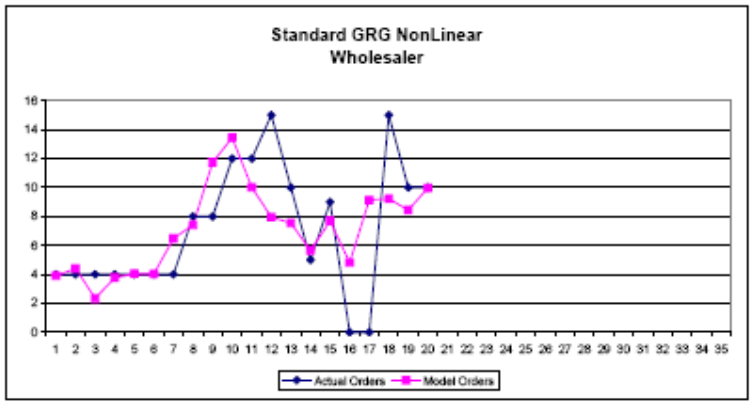


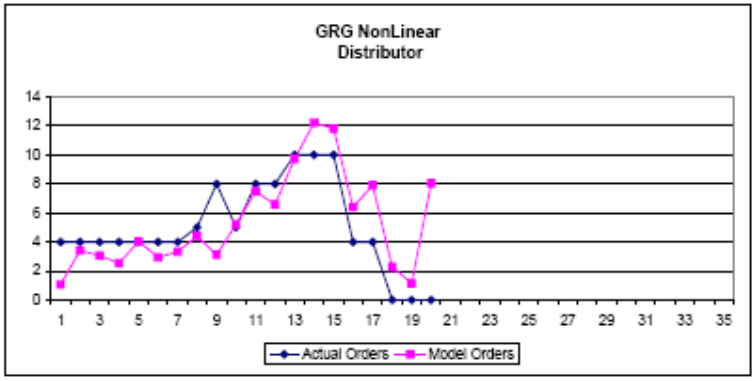


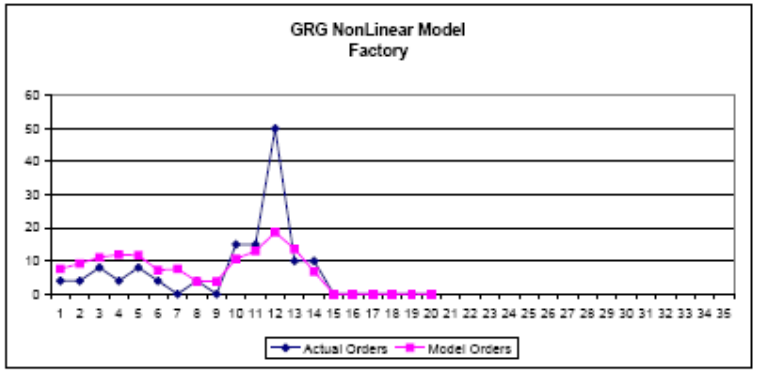
NORTHEAST MODEL WKS 1 to 20

ORDER CHARTS









NORTHEAST MODEL WKS 1 to 20 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	$ 862.00							Costs	$ 154.00						
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

NORTHEAST MODEL WKS 1 to 20 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 $ 289.00 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*

NORTHEAST MODEL WKS 1 to 20

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		NO IT									NORTH EAST	Factory	NO IT		
	$ 150.50											Costs	$ 268.50			
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	

NORTHEAST MODEL WKS 1 to 20 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

ROOT 66 MODEL WKS 1 to 20

RME GRG NonLinear

RETAILE WEEK	incoming orders IO	expected incoming orders eIO	actual orders AO	disturb-ance ε	model orders O_t	error term (AO-Ot)	squared errors $(AO-Ot)^2$	effective inventory EI	Stock S_t	Supply line SL_t
0	0	0								
1	4	0.00	4	0.154416	3.457829	0.5421711	0.29394955	12	12	12
2	4	0.48	4	-0.665985	3.113499	0.886501	0.78588402	12	12	12
3	4	0.90	6	-0.05814	4.140756	1.8592443	3.45678948	12	12	12
4	4	1.26	4	0.717213	5.122593	-1.122593	1.2602156	12	12	14
5	8	1.59	7	2.171013	9.756217	-2.756217	7.59673272	8	8	14
6	8	2.35	10	-1.096223	9.861623	0.1383774	0.01914831	4	4	17
7	8	3.03	10	0.14198	12.87302	-2.873017	8.25422871	2	2	21
8	8	3.62	14	-1.662125	12.59911	1.4008901	1.96249301	-2	0	27
9	8	4.14	14	-1.008845	13.20346	0.7965375	0.63447202	-3	0	34
10	8	4.60	14	-0.181543	14.16427	-0.164269	0.02698446	-1	0	38
11	8	5.00	10	-0.242194	13.46886	-3.468856	12.0329641	1	1	42
12	8	5.36	10	-0.867531	11.77301	-1.773014	3.14357791	3	3	42
13	8	5.67	14	0.047029	14.10291	-0.102911	0.01059071	1	1	46
14	8	5.95	20	-0.734036	13.7417	6.2582995	39.1663131	0	0	53
15	8	6.19	14	-0.484069	11.99333	2.0066657	4.02670712	2	2	63
16	8	6.41	14	-0.506707	12.32858	1.6714186	2.79363997	1	1	70
17	8	6.60	12	-0.986039	10.28535	1.7146529	2.9400346	3	3	74
18	8	6.77	12	1.774595	13.51878	-1.518779	2.30668919	2	2	79
19	8	6.91	10	0.331517	11.89658	-1.896581	3.59702066	2	2	83
20	8	7.04	10	0.65131	12.18278	-2.182779	4.76452233	2	2	85
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

mean of the disturbance -0.125218

std dev of the disturbance 0.94365

-0.029213 mean of the standard errors

		constraints		
Σ (AO-Ot)2	99.07296			
θ	0.12	>=0	<=1	
αs	0.71	>=0	<=1	
β	0.11	>=0	<=1	
S'	18.00	>=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

ROOT 66 MODEL WKS 1 to 20

WME - GRG NonLinear

WHOLESALE WEEK	incoming orders IO	expected incoming orders eIO	actual orders AO	disturb-ance ε	model orders O_t	error term (AO-Ot)	squared errors $(AO-Ot)^2$	effective inventory EI	Stock S_t	Supply line SL_t
0	4	0								
1	4	1.137096	4	1.7319	5.341687	-1.341687	1.80012483	12	12	12
2	4	1.950946	4	1.399065	5.822702	-1.822702	3.32224138	12	12	12
3	4	2.533439	9	-1.25361	3.75252	5.2474797	27.5360437	12	12	12
4	6	2.950344	7	-0.254401	5.168635	1.8313652	3.35389845	12	12	17
5	4	3.817282	6	-0.247477	6.098694	-0.098694	0.00974048	10	10	20
6	7	3.869224	5	-0.455735	5.942378	-0.942378	0.88807673	10	10	22
7	10	4.759223	6	0.006949	7.238863	-1.238863	1.5347822	12	12	18
8	10	6.24904	7	-0.63034	8.175688	-1.175688	1.38224188	9	9	17
9	14	7.315341	10	1.820178	11.8049	-1.804902	3.2576695	5	5	18
10	14	9.215617	7	1.630399	13.65589	-6.655892	44.3008934	-4	0	23
11	14	10.57569	10	0.111647	13.49722	-3.497217	12.2305252	-12	0	24
12	10	11.54913	16	-0.846729	13.51228	2.4877174	6.18873781	-19	0	27
13	10	11.10876	12	0.144824	14.06346	-2.063456	4.25784999	-19	0	33
14	14	10.79357	14	-1.35386	12.24958	1.750418	3.06396324	-22	0	38
15	20	11.70507	14	-0.2348	14.28015	-0.280148	0.078483	-26	0	42
16	14	14.06311	25	-2.191945	14.68104	10.318964	106.481008	-39	0	49
17	14	14.04517	20	1.103523	17.95857	2.0414345	4.16745481	-45	0	66
18	12	14.03233	15	-0.520866	16.32134	-1.321337	1.74593053	-51	0	78
19	12	13.45459	15	-0.846729	15.41774	-0.417736	0.17450371	-53	0	83
20	10	13.04109	15	0.144824	15.99579	-0.995787	0.9915911	-49	0	82
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

mean of the disturbance -0.037159

std dev of the disturbance 1.0972

0.0010446 mean of the standard errors

Σ (AO-Ot)2	226.7658	
θ	0.28	
αs	0.03	
β	0.00	
S'	100.00	

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

ROOT 66 MODEL WKS 1 to 20

DME - GRG NonLinear

DISTRIB WEEK	incoming orders IO	expected incoming orders eIO	actual orders AO	disturb-ance ε	model orders O_t	error term (AO-Ot)	squared errors $(AO-Ot)^2$	effective inventory EI	Stock S_t	Supply line SL_t
0	4	0								
1	4	2.417769	4	-0.247002	0.170767	3.8292328	14.6630238	12	12	12
2	4	3.374137	4	1.111074	2.485211	1.5147892	2.29458634	12	12	12
3	4	3.752435	6	0.265825	2.01826	3.9817401	15.8542545	12	12	12
4	9	3.902074	6	-0.484326	1.417748	4.5822523	20.9970359	12	12	14
5	7	6.983476	6	0.923178	10.90665	-4.906655	24.0752614	7	7	16
6	6	6.993464	8	-0.225013	12.76845	-4.768451	22.7381258	4	4	18
7	5	6.392972	6	0.13773	12.5307	-6.530702	42.6500724	4	4	20
8	6	5.551001	8	1.202202	11.7532	-3.753202	14.0865289	5	5	20
9	7	5.822395	8	-0.069958	10.75244	-2.752437	7.57590959	5	5	22
10	10	6.534189	6	-0.067508	10.46668	-4.466682	19.9512438	6	6	22
11	7	8.629072	8	1.1112	17.74027	-9.740272	94.8729059	2	2	22
12	10	7.644392	8	-2.385819	12.25857	-4.258573	18.1354432	3	3	22
13	16	9.068221	10	-0.473977	17.59424	-7.594244	57.6725411	1	1	22
14	12	13.25808	16	0.035374	23.29346	-7.293456	53.1945011	-9	0	26
15	14	12.49764	16	1.27837	23.77601	-7.776014	60.4664004	-13	0	34
16	14	13.40573	25	-0.676212	22.72952	2.2704802	5.15508022	-19	0	42
17	25	13.76493	25	0.141946	23.90688	1.0931211	1.19491384	-23	0	57
18	20	20.55588	40	-1.190505	29.36538	10.634621	113.095174	-32	0	66
19	15	20.21988	50	-0.351055	29.86883	20.131171	405.264057	-38	0	92
20	15	17.06476	50	-0.622006	26.44276	23.557241	554.9436	-41	0	130
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

mean of the disturbance -0.029324

std dev of the disturbance 0.893014

0.387698 mean of the standard errors

Σ (AO-Ot)2	1548.881
θ	0.60
αs	1.00
β	0.00
S'	10.00

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

ROOT 66 MODEL WKS 1 to 20

FME - GRG NonLinear

FACTOR\ WEEK	incoming orders IO	expected incoming orders eIO	actual orders AO	disturb-ance ε	model orders O_t	error term (AO-Ot)	squared errors $(AO-Ot)^2$	effective inventory EI	Stock S_t	Supply line SL_t
0	4	0								
1	4	4	4	-2.290003	1.709997	2.2900026	5.24411205	12	12	8
2	4	4	4	-1.349261	2.650739	1.3492608	1.82050467	12	12	8
3	4	4	4	-0.045087	3.954913	0.0450873	0.00203287	12	12	8
4	6	4	4	0.369153	4.369153	-0.369153	0.13627415	12	12	8
5	6	6	4	-0.169816	7.830184	-3.830184	14.6703102	10	10	8
6	6	6	6	-0.889105	9.110895	-3.110895	9.67766982	8	8	8
7	8	6	8	-0.724693	11.27531	-3.275307	10.7276362	6	6	10
8	6	8	6	-0.627018	17.37298	-11.37298	129.344728	2	2	14
9	8	6	8	-0.757398	15.2426	-7.242602	52.4552801	2	2	14
10	8	8	8	0.724461	18.72446	-10.72446	115.014059	2	2	14
11	6	8	10	-1.865115	18.13488	-8.134885	66.1763495	0	0	16
12	8	6	12	-1.214404	14.7856	-2.785596	7.75954755	2	2	18
13	8	8	10	0.080862	18.08086	-8.080862	65.3003379	2	2	22
14	10	8	14	-0.26075	15.73925	-1.73925	3.02499057	4	4	22
15	16	10	12	-0.207698	15.7923	-3.792302	14.3815532	6	6	24
16	16	16	20	0.582056	28.58206	-8.582056	73.6516913	0	0	26
17	25	16	26	0.624549	28.62455	-2.624549	6.88825615	-2	0	32
18	25	25	40	-2.290003	34.71	5.2900026	27.9841278	-15	0	46
19	40	25	60	-1.349261	35.65074	24.349261	592.886501	-20	0	66
20	50	40	100	-0.045087	51.95491	48.045087	2308.33042	-34	0	100
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

mean of the disturbance: -0.585181

std dev of the disturbance: 0.919295

0.2851808 mean of the standard errors

		constraints		
Σ (AO-Ot)2	3505.476	>=0	<=1	
θ	1.00	>=0	<=1	
αs	1.00	>=0	<=1	
β	0.00	>=0		INT
S'	12.00			

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:

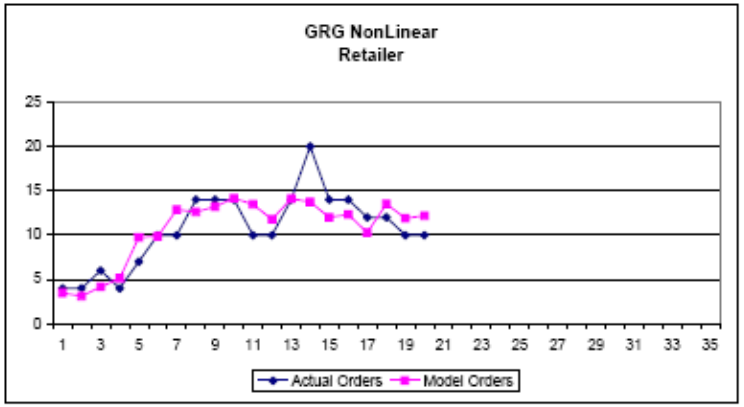
St = MAX(0,EI)

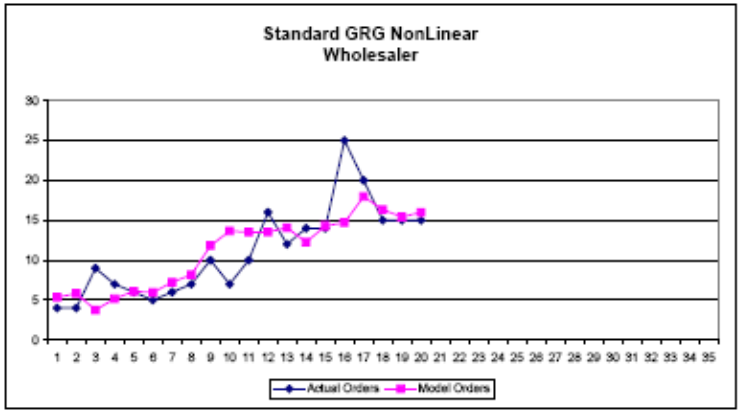
Supply Line:

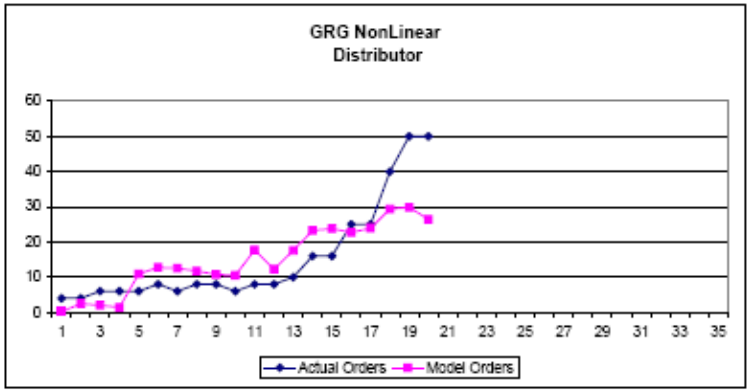
SLt = FSL = FPD1+FPD2

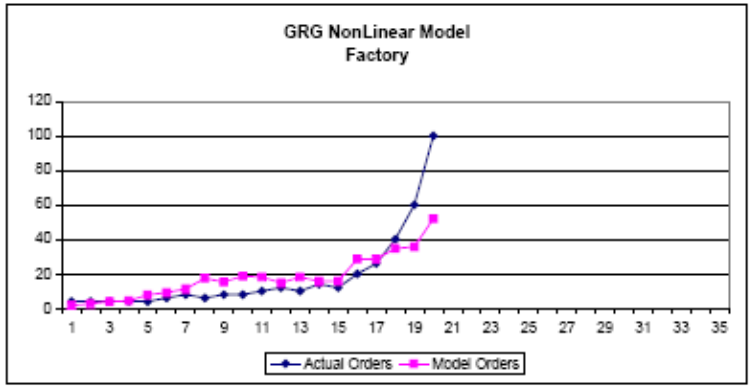
ROOT 66 MODEL WKS 1 to 20

ORDER CHARTS



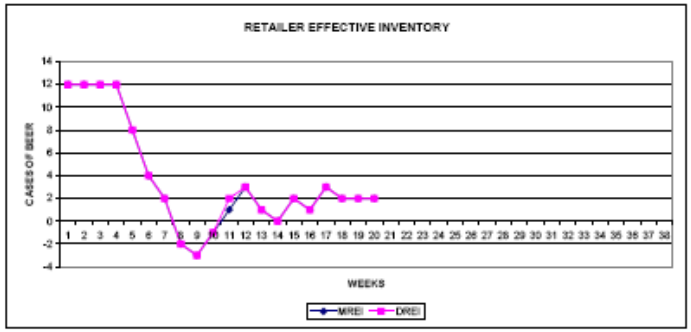


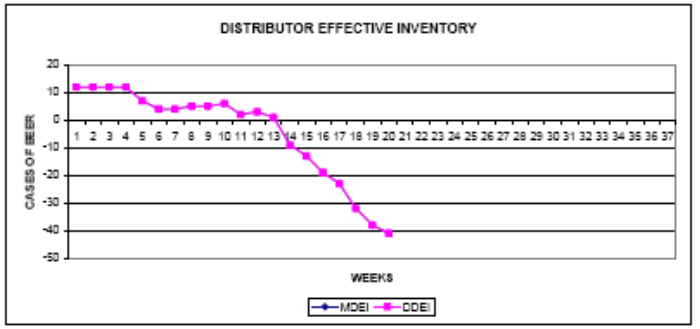


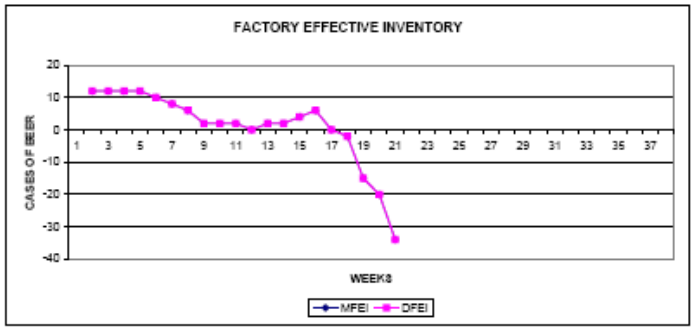


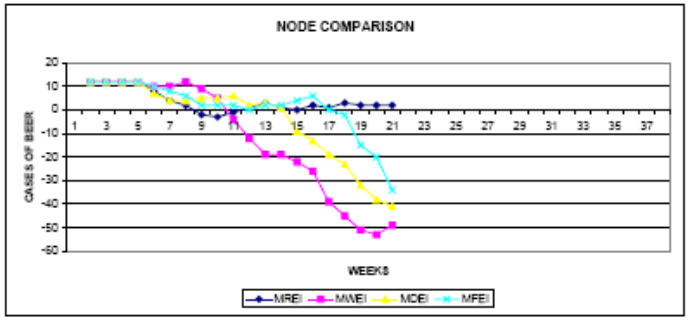
ROOT 66 MODEL WKS 1 to 20

MODEL CHARTS









ROOT 66 MODEL WKS 1 to 20

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
Team Costs $ 766.00

ROOT 66 Retailer NO IT
Costs $ 45.50

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

ROOT 66 MODEL WKS 1 to 20

MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

ROOT 66 Wholesaler Costs $ 386.00

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*

ROOT 66 MODEL WKS 1 to 20

MODEL WORKSHEET

STEP 5
Place and record your orders

Distributor NO IT
$ 217.50

ROOT 66 Factory NO IT
Costs $ 117.00

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	26	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

ROOT 66 MODEL WKS 1 to 20

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

SHINER MODEL WKS 1 to 20

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	5.045223	-1.045223	1.09249065	12	12	12
2	4	0.31	6	-0.665985	4.536312	1.4636877	2.14238157	12	12	12
3	4	0.60	8	-0.05814	5.40747	2.5925302	6.72121295	12	12	14
4	4	0.86	6	0.717213	6.399843	-0.399843	0.15987411	12	12	18
5	8	1.11	8	2.171013	9.258512	-1.258512	1.58385371	8	8	20
6	8	1.64	8	-1.096223	7.096342	0.9036579	0.81659762	6	6	22
7	8	2.14	8	0.14198	8.829463	-0.829463	0.68800808	6	6	22
8	8	2.60	8	-1.662125	8.050087	-0.050087	0.00250874	4	4	24
9	8	3.02	6	-1.008845	9.124204	-3.124204	9.7606504	4	4	24
10	8	3.40	8	-0.181543	10.64767	-2.647671	7.01016017	3	3	23
11	8	3.76	10	-0.242194	11.51322	-1.513219	2.28983093	1	1	25
12	8	4.09	12	-0.867531	11.46615	0.5338472	0.28499283	-1	0	29
13	8	4.40	10	0.047029	12.57734	-2.577342	6.64268943	-6	0	38
14	8	4.68	18	-0.734036	12.0051	5.9949046	35.9388815	-10	0	44
15	8	4.94	14	-0.484069	12.34634	1.6536622	2.73459857	-14	0	58
16	8	5.17	20	-0.506707	12.53837	7.4616347	55.6759917	-10	0	60
17	8	5.39	12	-0.986039	12.1355	-0.135504	0.0183613	-10	0	72
18	8	5.60	12	1.774595	15.05117	-3.051168	9.30962784	-10	0	76
19	8	5.78	12	0.331517	13.74732	-1.747323	3.05313644	-10	0	80
20	8	5.96	12	0.65131	14.23963	-2.239625	5.01592015	-6	0	80
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
	mean of the disturbance			-0.125218		-0.000763	mean of the standard errors			
	std dev of the disturbance			0.94365						

			constraints		
Σ (AO-Ot)2	160.9418				
θ	0.08		>=0	<=1	
αs	0.30		>=0	<=1	
β	0.04		>=0	<=1	
S'	29.00		>=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

SHINER MODEL WKS 1 to 20 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	3.616528	4	1.7319	3.938824	0.061176	0.0037425	12	12	12
2	4	3.963237	5	1.399065	3.952699	1.0473014	1.09684031	12	12	12
3	6	3.996476	5	-1.25361	1.333262	3.6667375	13.4449642	12	12	13
4	8	5.807926	5	-0.254401	5.553525	-0.553525	0.30639022	10	10	14
5	6	7.78985	6	-0.247477	10.36158	-4.361579	19.0233734	6	6	15
6	8	6.171589	6	-0.455735	9.239863	-3.239863	10.4967111	5	5	16
7	8	7.824714	7	0.006949	13.47008	-6.470076	41.8618847	2	2	17
8	8	7.983196	7	-0.63034	14.40087	-7.400872	54.772909	-1	0	19
9	8	7.996389	10	1.820178	16.86658	-6.866583	47.1499668	-3	0	20
10	6	7.999846	7	1.630399	16.67826	-9.678261	93.6687287	-5	0	24
11	8	6.191721	13	0.111647	13.35139	-0.351385	0.12347153	-8	0	28
12	10	7.826644	10	-0.846729	14.02793	-4.027932	16.2242326	-12	0	37
13	12	9.791645	13	0.144824	16.98448	-3.984484	15.8761163	-18	0	43
14	10	11.78829	20	-1.35386	17.48245	2.5175541	6.33807868	-18	0	44
15	18	10.17144	30	-0.2348	16.98466	13.015344	169.399171	-20	0	56
16	14	17.24949	35	-2.191945	22.10556	12.894438	166.266524	-30	0	78
17	20	14.31152	40	1.103523	22.46306	17.536938	307.544196	-36	0	105
18	12	19.45466	25	-0.520866	25.98181	-0.981807	0.96394449	-44	0	133
19	12	12.71466	20	-0.846729	18.91595	1.0840486	1.17516141	-44	0	146
20	12	12.06851	15	0.144824	19.26135	-4.261353	18.1591325	-41	0	151
21										
22										
23										
24										
25										
26										
27										
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31										
32										
33										
34										
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36										
37										
38										
39										
40										
		mean of the disturbance		-0.037159		-0.017709	mean of the standard errors			
		std dev of the disturbance		1.0972						

Σ (AO-Ot)2	983.8955		constraints		
θ	0.90		>=0	<=1	
αs	0.70		>=0	<=1	
β	0.00		>=0	<=1	
S'	10.00		>=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

SHINER MODEL WKS 1 to 20

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	2.276081	4	-0.247002	0	4	16	12	12	12
2	4	3.257025	6	1.111074	1.3681	4.6319004	21.4545017	12	12	12
3	5	3.679793	2	0.265825	0.945618	1.0543822	1.11172182	12	12	14
4	5	4.431017	0	-0.484326	1.946691	-1.946691	3.78960698	11	11	12
5	5	4.75478	2	0.923178	4.677958	-2.677958	7.17146083	10	10	8
6	6	4.894315	4	-0.225013	2.669302	1.3306978	1.77075661	11	11	4
7	6	5.523472	4	0.13773	7.661202	-3.661202	13.4044009	7	7	6
8	7	5.794626	12	1.202202	14.99683	-2.996828	8.98097651	1	1	10
9	7	6.480508	10	-0.069958	15.41056	-5.41056	29.2740533	-4	0	20
10	10	6.776109	12	-0.067508	15.7086	-3.708602	13.7537261	-7	0	26
11	7	8.610568	18	1.1112	18.72177	-0.721768	0.52094947	-13	0	34
12	13	7.694122	12	-2.385819	14.3083	-2.308303	5.32826459	-8	0	40
13	10	10.71327	6	-0.473977	19.2393	-13.2393	175.278966	-13	0	44
14	13	10.30741	8	0.035374	19.34278	-11.34278	128.65867	-15	0	42
15	20	11.83955	10	1.27837	22.11792	-12.11792	146.84391	-20	0	42
16	30	16.48301	18	-0.676212	24.8068	-6.806797	46.332486	-28	0	40
17	35	24.17445	25	0.141946	33.3164	-8.316395	69.1624293	-46	0	46
18	40	30.33441	50	-1.190505	38.1439	11.856099	140.567094	-66	0	56
19	25	35.83432	60	-0.351055	44.48327	15.516732	240.768967	-102	0	102
20	20	29.66938	80	-0.622006	38.04737	41.952631	1760.02321	-116	0	151
21										
22										
23										
24										
25										
26										
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31										
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34										
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37										
38										
39										
40										
		mean of the disturbance		-0.029324		0.2543677	mean of the standard errors			
		std dev of the disturbance		0.893014						

Σ (AO-Ot)2	2830.196		constraints		
θ	0.57		>=0	<=1	
αs	1.00		>=0	<=1	
β	0.00		>=0	<=1	
S'	9.00		>=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

SHINER MODEL WKS 1 to 20 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	4.174584	-0.174584	0.03047963	12	12	8
2	4	4	6	-1.349261	5.115326	0.884674	0.78264807	12	12	8
3	6	4	6	-0.045087	6.419499	-0.419499	0.17597981	12	12	10
4	2	6	5	0.369153	9.819575	-4.819575	23.2283012	10	10	12
5	0	2	3	-0.169816	3.308936	-0.308936	0.09544156	14	14	11
6	2	0	0	-0.889105	0	0	0	20	20	8
7	4	2	0	-0.724693	0	0	0	23	23	3
8	4	4	2	-0.627018	0.908396	1.0916044	1.19160017	22	22	0
9	12	4	8	-0.757398	2.749684	5.2503156	27.565814	18	18	2
10	10	12	8	0.724461	18.14655	-10.14655	102.952512	6	6	10
11	12	10	12	-1.865115	16.51448	-4.51448	20.380528	-2	0	16
12	18	12	12	-1.214404	19.16519	-7.165192	51.3399698	-6	0	20
13	12	18	15	0.080862	26.46046	-11.46046	131.342087	-16	0	24
14	6	12	4	-0.26075	20.11885	-16.11885	259.817167	-16	0	27
15	8	6	11	-0.207698	14.1719	-3.171897	10.0609301	-10	0	19
16	10	8	12	0.582056	16.96165	-4.961651	24.6179851	-3	0	15
17	18	10	15	0.624549	19.00414	-4.004144	16.0331679	-9	0	23
18	25	18	30	-2.290003	24.08959	5.9104075	34.9329173	-16	0	27
19	50	25	65	-1.349261	32.03033	32.969666	1086.99886	-29	0	45
20	60	50	80	-0.045087	58.33451	21.665492	469.393553	-64	0	95
21										
22										
23										
24										
25										
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31										
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37										
38										
39										
40										
	mean of the disturbance			-0.585181		0.0253173	mean of the standard errors			
	std dev of the disturbance			0.919295						

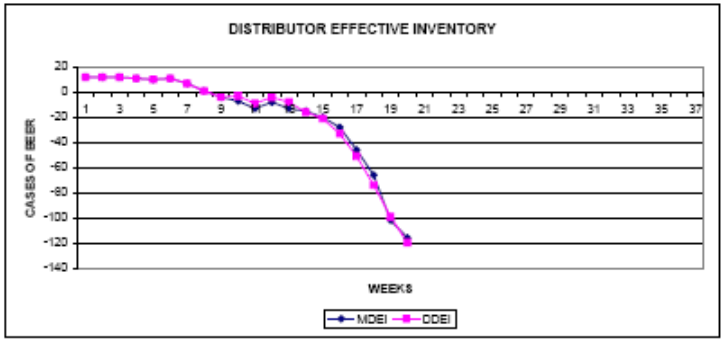
Σ (AO-Ot)2	2260.94		constraints		
θ	1.00		>=0	<=1	
αs	0.49		>=0	<=1	
β	0.00		>=0	<=1	
S'	17.00		>=0		INT

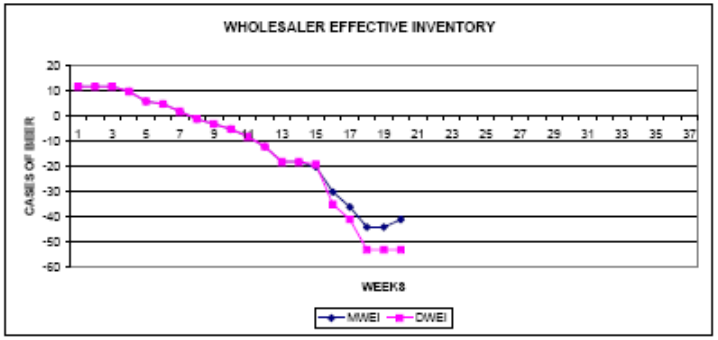
GRG NonLinear

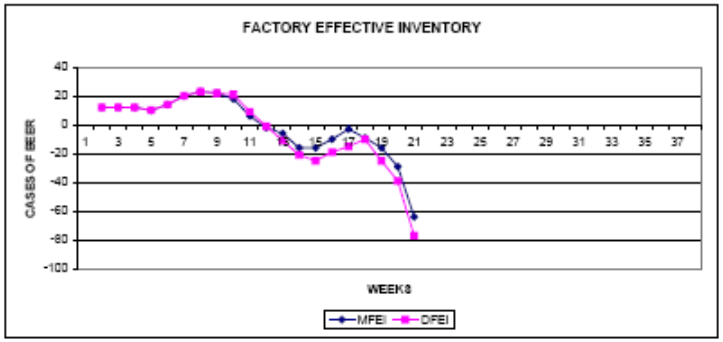
Incoming Orders:
IO = FIO
Expected Incoming Orders:
$eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
Actual Orders:
AO = FPR
Disturbance:
normally distributed white noise
mean = 0
std dev = 1
Model Orders:
$Ot = MAX(0, eIO + \alpha s(s' - S_t - \beta SL_t) + \varepsilon$
Error Term:
$AO - O_t$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

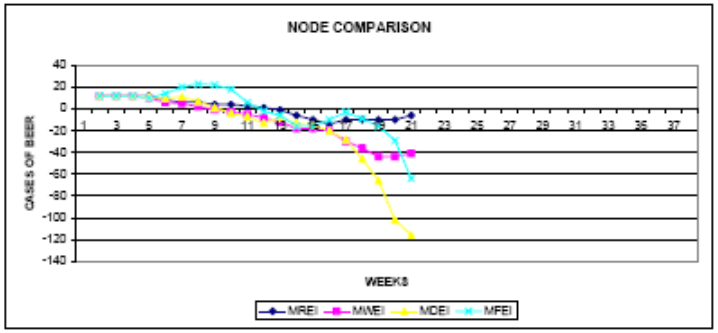
SHINER MODEL WKS 1 to 20

MODEL CHARTS



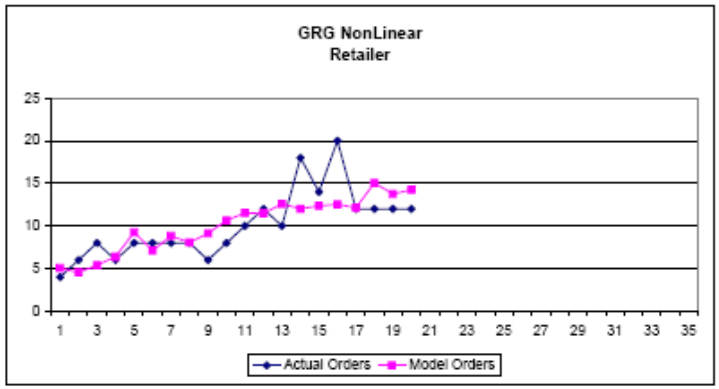


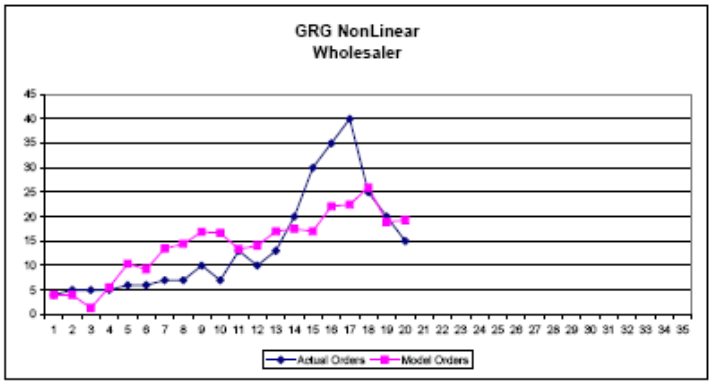


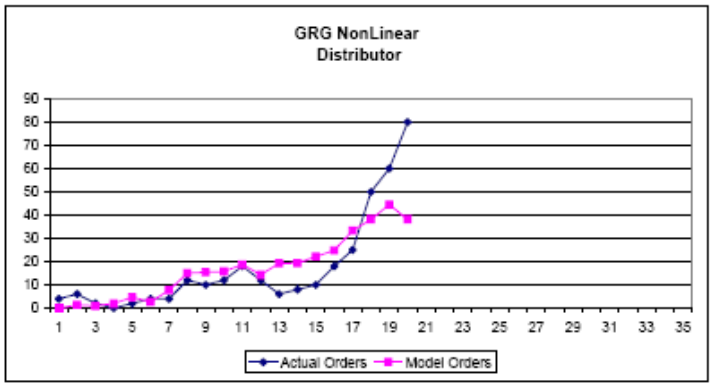


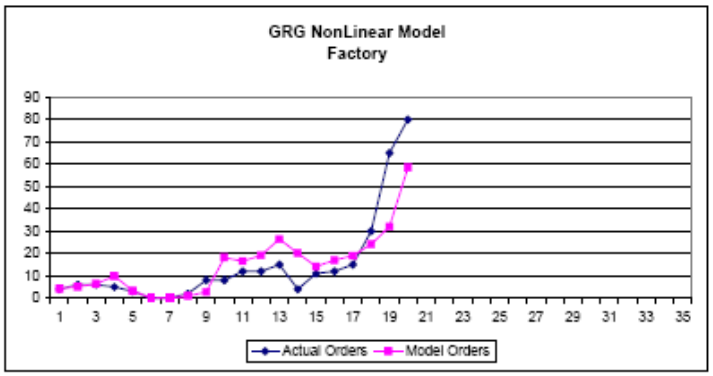
SHINER MODEL WKS 1 to 20

ORDER CHARTS









SHINER MODEL WKS 1 to 20 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	$ 1,148.00							Costs	$ 117.00						
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

SHINER MODEL WKS 1 to 20 MODEL WORKSHEET

STEP 3
Record your inventory or backlog

STEP 4
Advance the order slips and the brewery Brews

					SHINER Costs	Wholesaler $ 309.50		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*

SHINER MODEL WKS 1 to 20

MODEL WORKSHEET

STEP 5
Place and record your orders

	Distributor		NO IT								SHINER	Factory	NO IT	
	$ 476.00										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	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

SHINER MODEL WKS 1 to 20 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