References

1. Vanderplaats, G.N., Numerical Optimization Techniques for Engineering Design, McGraw-Hill Book Co., 1984.
2. Hicks, R.M., Murman, E.M., and Vanderplaats, G.N., "An Assessment of Airfoil Design by Numerical Optimization," NASA TM-3092, July 1974.
3. Vanderplaats, G.N., and Hicks, R.M., "Numerical Airfoil Optimization Using Reduced Number of Design Coordinates," NASA TM-73151, July 1976.
4. Hicks, R.M., and Henne, P.A., "Wing Design by Numerical Optimization," AIAA Paper 77-1247, 1977.
5. Vanderplaats, G.N., "Approximation Concepts for Numerical Airfoil Optimization," NASA TP-1370, 1979.
6. Lores, M.E., Smith, P.R., and Hicks, R.M., "Supercritical Wing Design Using Numerical Optimization and Comparisons with Experiment," AIAA Paper 79-0065, 1979.
7. Sobieszczanski-Sobieski, J., "The Case for Aerodynamic Sensitivity Analysis," Presents at the NASA/VPI&SU Symposium on Sensitivity Analysis in Engineering, Sept. 25-26, 1986.
8. Eleshaky, M.E., "A Computational Aerodynamic Design Optimization Method Using Sensitivity Analysis," Ph.D. Dissertation, Old Dominion University, May 1992.
9. Burgreen, G.W., "Three-Dimensional Aerodynamic Shape Optimization Using Discrete Sensitivity Analysis," Ph.D. Dissertation, Old Dominion University, May 1994.
10. Reuther, J.J., "Aerodynamic Shape Optimization Using Control Theory," Ph.D. Dissertation, University of California at Davis, May 1996.
11. Joh, C.-Y., Grossman, B., and Haftka, R.T., "Efficient Optimization Procedure for Transonic Airfoil Design," ASME Winter Annual Meeting, *Computational Structural Mechanics and Multidisciplinary Optimization*, Book No. H00534, Dec. 1989, pp. 67-76.
12. Malone, J.B., Narramore, J.C., and Sankar, L.N., "An Efficient Airfoil Design Method Using the Navier-Stokes Equations," in Computational Methods for Aerodynamic Design and Optimization, AGARD CP-463, 1990, pp. 5.1-5.18.
13. Newman III, J.C., and Taylor III, A.C., "Three-Dimensional Aerodynamic Shape Sensitivity Analysis and Design Optimization Using the Euler Equations on Unstructured Grids," *Proc., 14th AIAA Applied Aerodynamics Conference* AIAA Paper 96-2464, June 1996.
14. Elliot, J., and Peraire, J., "Practical 3D Aerodynamic Design and Optimization Using Unstructured Grids," AIAA Paper 96-4170, Sept. 1996.

15. Korivi, V.M., Taylor III, A.C., Newman, P.A., Hou, G.J.-W., and Jones, H.E., "An Approximate Factored Incremental Strategy for Calculating Consistent Discrete CFD Sensitivity Derivatives," *J. Comp. Physics*, Vol. 113, 1994, pp. 336-346. (see also NASA TM 104207, 1992.)

16. Huffman, W.P., Melvin, R.G., Young, D.P., Johnson, F.T., Bussoletti, J.E., Bieterman, M.B., and Hilmes, C.L., "Practical Design and Optimization in Computational Fluid Dynamics," AIAA 93-3111, 1993.

17. Bischof, C.H., Green, L.L., Haigler, K.J., and Knauff, T.L., "Parallel Calculation of Sensitivity Derivatives for Aircraft Design Using Automatic Differentiation," AIAA Paper 94-4261, 1994.

18. Felker, F.F., "Calculation of Optimum Airfoils Using Direct Solutions of the Navier-Stokes Equations," AIAA Paper 93-3323, 1993.

19. Huddleston, D.H., Soni, B.K., and Zheng, X., "Application of a Factored Newton-Relaxation Scheme to Calculation of Discrete Aerodynamic Sensitivity Derivatives," AIAA Paper 94-1894, 1994.

20. Risk, M.H., "Application of the Single-Cycle Optimization Approach to Aerodynamic Design," *J. of Aircraft*, Vol. 22, No. 6, June 1985, pp. 509-515.

21. Kuruvila, G., Taasan, S., and Salas, M.D., "Airfoil Optimizations by the One-Shot Method," Special Course on Optimum Design Methods for Aerodynamics, von Karman Institute for Fluid Dynamics, Rhode-Saint-Genese, Belgium, April 1994.

22. Campbell, R.L., "An Approach to Constrained Aerodynamic Deisgn with Application to Airfoils," NASA TP-3260, 1992.

23. Orozco, C., and Ghattas, O., "Optimum Design of Systems Governed by Nonlinear Partial Differential Equations," AIAA Paper 92-4836, 1992.

24. Oloso, A., and Taylor III, A.C., "Aerodynamic Shape-Sensitivity Analysis and Design Optimization on the IBM-SP2 Using the 3D Euler Equations," *Proc., 15th AIAA Applied Aerodynamics Conference*, AIAA Paper 97-2273, June 1997.

25. Korivi, V.M., "Aerodynamic Design Optimization with Consistently Discrete Sensitivity Derivatives via the Incremental Iterative Method," Ph.D. Dissertation, Old Dominion University, May 1995.

26. Barth, T.J., and Linton, S.W., "An Unstructured Mesh Newton Solver for Compressible Fluid Flow and Its Parallel Implementation," AIAA Paper 95-0221, Jan. 1995.

27. Hou, G.J.-W., Taylor III, A.C., Mani, S.V., and Newman, P.A., "Formulation for Simultaneous Analysis and Design Optimization," presented at the *Second U.S. Congress on Computational Mechanics* Aug. 16-18, 1993.

28. Haftka, R.T., "Simultaneous Analysis and Design," *AIAA J.*, Vol. 23, No. 7, July 1985, pp. 1099-1103.

29. Risk, M.H., "Optimization by Updating Design Parameters As CFD Iterative Flow Solutions Evolve," ASME Winter Annual Meeting, Symposium on Multidisciplinary Applications of CFD, Dec. 1-6, 1991.

30. Iollo, A., Kuruvila, G., and Ta'asan, S., "Psuedo-Time Method for Optimal Shape Design Using the Euler Equations," ICASE Report 95-59, Aug. 1995.

31. Reuther, J., Rimlinger, M.J., Alonso, J.J., and Jameson, A., "Rapid Cycle Aerodynamic Shape Optimization of Complex Aircraft Configurations via an Adjoint Formulation and Parallel Computing," NASA Computational Aerosciences Workshop, 1996.

32. Elliot, J., and Peraire, J., "Practical 3D Aerodynamic Design and Optimization Using Unstructured Grids," AIAA Paper 96-1941, June 1996.

33. Reuther, J., Jameson, A., Farmer, J., Martinelli, L., and Saunders, D., "Aerodynamic Shape Optimization of Complex Aircraft Configurations via an Adjoint Formulation," AIAA Paper 96-0094, Jan. 1996.

34. Arabshahi, S., and Whitfield, D.L., "A Multiblock Approach to the Three-Dimensional Unsteady Euler Equations About a Wing-Pylon-Store Configuration," AIAA 89-3401, 1989.

35. Ghaffari, F., Luckering, J.M., Thomas, J.L., Bates, B.L., and Biedron, R.T., "Multiblock Navier-Stokes Solutions About the F/A-18 Wing-LEX-Fuselage Configuration," *J. of Aircraft*, Vol. 30, No. 3, June 1993.

36. Walters, R.W., Reu, T., McGrory, W.D., Thomas, J.L., Richardson, P.F., "A Longitudinally-Patched Grid Approach with Applications to High Speed Flows," AIAA Paper 88-0715, 1988.

37. Thomas, J.L., Walters, R.W., Reu, T., Ghaffari, F., Weston, R.P., and Luckring, J.M., "A Patched-Grid Algorithm for Complex Configurations Directed Toward the F/A-18 Aircraft," AIAA Paper 89-0121, 1989.

38. Meakin, R.L., "Moving Body Overset Grid Methods for Complete Aircraft Tiltrotor Simulations," AIAA Paper 93-3350, 1993.

39. Baysal, O., Fouladi, K., and Lessard, V.R., "Multigrid and Upwind Viscous Flow Solver on 3-D Overlapped and Embedded Grids," *AIAA J.*, Vol.29, No. 4, April 1991, pp. 903-910.

40. Steger, J.L., Dougherty, F.C., and Benek, J.A., "A Chimera Grid Scheme," ASME Symposium on Advances in Grid Generation, FED-Vol. 5, June 1983.

41. Jameson, A., "Aerodynamic Design via Control Theory," *J. Sci. Comp.*, Vol. 3, 1988, pp. 233-260.

42. Pirionneau, O., "On Optimum Design in Fluid Mechanics," *J. of Fluid Mechanics*, Vol 64, 1974, pp. 117-128.

43. Eleshaky, M.E., and Baysal, O., "Shape Optimization of a 3D Nacelle Near a Flat Plate Wing Using Multiblock Sensitivity Analysis," AIAA Paper 94-0160, Jan. 1994.

44. Taylor III, A.C., "Automatic Differentiation of Advanced Flow-Analysis Codes in Incremental Iterative Form for Multidisciplinary Applications," Final Report, Master Contract NAS1-19858 (Task No. 77), Nov. 1995.

45. Taylor III, A.C., Oloso, A., and Newman III, J.C., "CFL3D.ADII (Version 2.0): An Efficient, Accurate, General-Purpose Code for Flow Shape-Sensitivity Analysis," *Proc., 15th AIAA Applied Aerodynamics Conference*, AIAA Paper 97-2204, June 1997.

46. Slack, D.C., Walters, R.W., and Lohner, R., "An Interactive Adaptive Remeshing Algorithm for the Two-Dimensional Euler Equations," AIAA Paper 90-0331, 1990.

47. Rausch, R.D., Batina, J.T., and Yang, H.T.Y., "Spatial Adaptation Procedures on Unstructured Meshes for Accurate Unsteady Aerodynamic Flow Computations," AIAA Paper 91-1106, April 1991.

48. Beux, F., and Dervieux, A., "Exact-Gradient Shape Optimization of a 2D Euler Flow," *Finite Elements in Analysis and Design*, Vol. 12, 1992, pp. 281-302.

49. Newman III, J.C., Taylor III, A.C., and Burgreen, G.W., "An Unstructured Grid Approach to Sensitivity Analysis and Shape Optimization Using the Euler Equations," *Proc., 12th AIAA Computational Fluid Dynamics Conference*, AIAA Paper 95-1646, June 1995.

50. Newman III, J.C., Taylor III, A.C., and Barnwell, R.W., "Aerodynamic Shape Sensitivity Analysis and Design Optimization of Complex Configurations Using Unstructured Grids," *Proc., 15th AIAA Applied Aerodynamics Conference*, AIAA Paper 97-2275, June 1997.

51. Burgreen, G.W., and Antaki, J.F., "CFD-Based Design Optimization of a Three-Dimensional Rotary Blood Pump," AIAA Paper 96-4185, Sept. 1996.

52. Anderson, W.K., and Venkatakrishnan, V., "Aerodynamic Design Optimization on Unstructured Grids with a Continuous Adjoint Formulation," AIAA Paper 97-0643, Jan. 1997.

53. Taylor III, A.C., Newman, P.A., Hou, G.J.-W., and Jones, H.E., "Recent Advances in Steady Compressible Aerodynamic Sensitivity Analysis," presented at the IMA Workshop on Flow Control, Nov. 1992.

54. Guruswamy, G. P. and Yang, T. Y., "Aeroelastic Time Response Analysis of Thin Airfoils by Transonic Code LTRAN2," *J. of Computers and Fluids*, Vol. 9, 1980, pp. 409–425.

55. Johnson, E. H. and Reymond, M. A., "Multidisciplinary Aeroelastic Analysis and Design Using MSC/NASTRAN," AIAA Paper 91–1097, 1991.

56. ELFINI Aeroelasticity—General Introduction Manual. Doc. No. ELF-AER-I, Avions Marcel Dassault-Breguet Aviation, Saint-Cloud, France, 1989.

57. Neil, D .J. and Johnson, E. H., "Automated Structural Optimization System (ASTROS)," AFWAL TR-88-3028, 1988.

58. Borland, C. J., "XTRANS3S—Transonic Steady and Unsteady Aerodynamics for Aeroelastic Applications," AFWAL TR-85-3124, 1986.

59. Batina, J. T., Seidel, D. A., Bland, S. R. and Bennett, R. M., "Unsteady Transonic Flow Calculations for Realistic Aircraft Configurations," *J. of Aircraft*, Vol. 26, 1989, pp. 131–139.

60. Guruswamy, G. P., "ENSAERO—A Multidisciplinary Program for Fluid/Structural Interaction Studies of Aerospace Vehicles," *Computing Syst. Engr.*, Vol. 1, 1990, pp. 237–256.

61. Edwards, J. W. and Malone, J. B., "Current Status of Computational Methods for Transonic Unsteady Aerodynamics and Aeroelastic Applications," AGARD CP-507, 1992.

62. Batina, J. T., Lee, E. M., Kleb, W. L. and Rausch, R. D., "Unstructured-Grid Methods Developed for Unsteady Aerodynamic and Aeroelastic Analyses," AGARD CP-507, 1992.

63. Borland, C. J., "A Multidisciplinary Approach to Aeroelastic Analysis," *Computing Syst. Engr.*, Vol. 1, 1990, pp. 197–209.

64. Weston, R. P., Townsend, J. C., Eidson, T. M., and Gates, R. L., "A Distributed Computing Environment for Multidisciplinary Design," AIAA Paper 94-4372, 1994.

65. Felker, F.F., "A New Method fo Transonic Static Aeroelastic Problems," AIAA Paper 92-2123, 1992.

66. Sutjahjo, E., and Chamis, C.C., "Multidisciplinary Coupled Finite-Element Procedures for Fluid Mechanics, Heat Transfer, and Solid Mechanics," AIAA Paper 94-4256, 1994.

67. Ghattas, O., and Li, X., "A Variational Finite Element Method for Stationary Nonlinear Fluid-Solid Interactions," *J. of Computational Physics*, Vol. 121, 1995, pp. 347-356.

68. Thomas, J. L., Taylor, S. L. and Anderson, W. K., "Navier-Stokes Computations of Vortical Flows Over Low Aspect Ratio Wings," *AIAA J.*, Vol. 28, 1990, pp. 205–212.

69. Vatsa, V. N. and Wedan, B. W., "Development of a Multigrid Code for 3-D Navier-Stokes Equations and Its Application to a Grid-Refinement Study," *J. of Computers and Fluids*, Vol. 18, 1990, pp. 391–403.

70. Buning, P. G. and Chan, W. M., "OVERFLOW/F3D User's Manual," NASA Ames Research Center, 1991.

71. Frink, N. T., Pirzadeh, S., and Parikh, P., "An Unstructured-Grid Software System for Solving Complex Aerodynamic Problems," NASA CP-3291, 1995.

72. Anderson, W. K. and Bonhaus, D. L., "An Implicit Upwind Algorithm for Computing Turbulent Flows on Unstructured Grids," *J. of Computers and Fluids*, Vol. 23, 1994, pp. 1–21.

73. Tzong, G., Chen, H.H., Chang, K.C., Wu, T., and Cebeci, T., "A General Method for Calculating Aero-Structure Interaction on Aircraft Configurations," AIAA Paper 96-3982, 1996.

74. Cavallo, P. A., "Coupling Static Aeroelastic Predictions with an Unstructured Grid Euler/Interacting Boundary Layer Method," M.S. Thesis, George Washington University, July 1995.

75. Giles, G. L., "Further Generalization of an Equivalent Plate Representation for Aircraft Structural Analysis," *J. of Aircraft*, Vol. 26, 1989, pp. 67–74.

76. Bhat, M. K. and Parikh, P., "Development of an Unstructured Grid Fluids Module for ENSAERO in a Parallel Environment," NASA Computational Aerosciences Workshop 1996, NASA Ames Research Center, Moffitt Field, CA.

77. Guruswamy, G. P. and Byun, C., "Fluid-Structural Interactions Using the Navier-Stokes Flow Equations Coupled with Shell Finite Element Structures," AIAA Paper 93-3087, 1993.

78. Newman III, J.C., Newman, P.A., Taylor III, A.C., and Hou, G.J-.W., "Nonlinear Aerodynamic Design Optimization of a Flexible Wing," AIAA Paper 96-4108, Sept. 1996.

79. Newman III, J.C., Newman, P.A., Taylor III, A.C., and Hou, G.J-.W., "Efficient Nonlinear Static Aeroelastic Wing Analysis," Submitted to *J. of Computers and Fluids.*

80. Appa, K., "Finite-Surface Splines," *J. of Aircraft*, Vol. 26, No. 5, May 1989, pp. 495-496.

81. Samareh, J., "Use of CAD Geometry in MDO," AIAA Paper 96-3991, 1996.

82. Farin, G., Curves and Surfaces for Computer Aided Geometric Design, Academic Press, 1990.

83. AIAA White Paper, AIAA Technical Committee on Multidisciplinary Design Optimization (MDO), Jan. 15, 1991.

84. Grose, D.L., "Re-Engineering the Aircraft Design Process," AIAA Paper 94-4323, 1994.

85. Jameson, A., "Re-Engineering the Design Process Through Computation," AIAA Paper 97-0641, 1997.

86. Sobieszczanski-Sobieski, J., "Sensitivity Analysis and Multidusciplinary Optimization for Aircraft Design: Recent Advances and Results," *J. of Aircraft*, Vol. 27, No. 12, Dec. 1990, pp. 993-1001.

87. Sobieszczanski-Sobieski, J., "Multidisciplinary Design and Optimization," *Integrated Design Analysis and Optimization of Aircraft Structures*, AGARD LS-186, May 1992.

88. Sobieszczanski-Sobieski, J., and Haftka, R.T., "Multidisciplinary Aerospace Design Optimization: Survey of Recent Developments," AIAA Paper 96-0711, Jan. 1996.

89. Cramer, E.J., Dennis, J.E., Frank, P.D., Lewis, R.M., and Shubin, G.R., "Problem Formulation for Multidisciplinary Optimization," *SIAM J. of Optimization*, Vol. 4, No. 4, Nov. 1994, pp. 754-776.

90. Balling, R.J., and Sobieszczanski-Sobieski, J., "Optimization of Coupled Systems: A Critical Overview of Approaches," AIAA 94-4330, 1994.

91. Newman, P.A., Hou, G.J.-W., and Taylor III, A.C, "Observations Regarding Use of Advanced CFD Analysis, Sensitivity Analysis, and Design Codes in MDO," *Multidisciplinary Design Optimization: State of the Art*, SIAM Proceeding Series, 1997, pp. 263-279. (see also ICASE Report 96-16 or NASA CR 198293.)

92. Sobieszczanski-Sobieski, J., "On the Sensitivity of Complex, Internally Coupled Systems," AIAA Paper 88-2378, 1988.

93. James, B.B., "An Alternative Formulation of the Global Sensitivity Equations," Symposium On Recent Advances in Multidisciplinary Analysis and Optimization, San Francisco, CA, 1990.

94. Cramer, E.J., Frank, P.D., and Shubin, G.R., "On Alternative Problem Formulations for MDO," AIAA Paper 92-4752, 1992.

95. Shubin, G.R., "Application of Alternative Multidisciplinary Optimization Formulation to a Model Problem for Static Aeroelasticity," *J. of Computational Physics*, Vol. 118, 1995, pp. 73-85.

96. Grossman, B., Haftka, R.T., Kao, P.J., Polen, D.M., Rais-Rohani, M., and Sobieszczanski-Sobieski, J., "Integrated Aerodynamic-Structural Design of a Transport Wing," *J. of Aircraft*, Vol. 27, No. 12, 1990, pp. 1050-1056.

97. Barthelemy, J.-F.M., and Bergen, F.D., "Shape Sensitivity Analysis of Wing Static Aeroelastic Characteristics," NASA TP-2808, May 1988.

98. Wakayama, S., and Kroo, I., "Subsonic Wing Planform Design Using Multidisciplinary Optimization," *J. of Aircraft*, Vol. 32, No. 4, July-Aug. 1995, pp. 746-753.

99. Rais-Rohani, M., Haftka, R.T., Grossman, B., and Unger, E.R., "Integrated Aerodynamic-Structural-Control Wing Design," AIAA Paper 92-4694, 1992.

100. Arslan, A.E., and Carlson, L.A., "Integrated Determination of Sensitivity Derivatives for an Aeroelastic Transonic Wing," AIAA Paper 94-4400, 1994.

101. Arian, E., and Ta'asan, S., "Analysis of the Hessian for Aerodynamic Optimization: Inviscid Flow," ICASE Report 96-28, April 1996.

102. Arian, E., "Analysis of the Hessian for Aeroelastic Optimization," ICASE Report 95-84, Dec. 1995.

103. Haftka, R.T., and Gurdal, Z., Elements of Structural Optimization, Kluwer Academic Publishers, 1992.

104. Walsh, G.R., Methods of Optimization, John Wiley, 1975

105. Iollo, A., Salas, M., Ta'asan, S., "Shape Optimization Governed by the Euler Equations Using an Adjoint Method," ICASE Report 93-78, 1993.

106. Zoutendijk, G., Methods of Feasible Directions, Elsevier, 1960.

107. Vanderplaats, G.N., "An Efficient Feasible Directions Algorithm for design Synthesis," *AIAA J.*, Vol. 22, No. 11, Nov. 1984, pp. 1633-1640.

108. Avriel, M., Nonlinear Programming: Analysis and Methods, Prentice-Hall, Inc., 1976.

109. Powell, M.J.D., "An Efficient Method for Finding the Minimum of a Function of Several Variables without Calculating Derivatives," *Computer J.*, Vol. 7, 1964, pp. 155-162.

110. Himmelblau, D.M., Applied Nonlinear Programming, McGraw-Hill Book Co., 1972.

111. Kiefer, J., "Sequential Minmax Search for a Maximum," *Proc., American Mathematical Society*, Vol. 4, 1953, pp. 502-506.

112. Walters, R.W., "Compressible Flow Algorithm on Structured and Unstructured Grids," *Proc., 9th Conf. on Computing Methods in Applied Sciences and Engineering*, Paris, Jan. 29-Feb.5, 1990.

113. Swanson, R.C., and Turkel, E., "Artificial Dissipation and Central Difference Schemes," AIAA Paper 87-1107, 1987.

114. Jameson, A., Schmidt, W., and Turkel, E., "Numerical Solution of the Euler Equations by Finite Volume Methods Using Runge-Kutta Time Stepping Scheme," AIAA Paper 81-1259, 1981.

115. Jameson, A., "Artificial Diffusion, Upwind Biasing, Limiters and their effect on Accuracy and Multigrid Convergence in Transonic and Hypersonic Flow," AIAA Paper 93-3559, 1993.

116. Steger, J.L., and Warming, R.F., "Flux Vector Splitting of the Inviscid Gasdynamic Equations with Application to Finite Difference Methods," NASA TM-78605, July 1979.

117. Van Leer, B., "Flux Vector Splitting for the Euler Equations," *Lecture Notes in Physics*, Vol. 170, Springer-Verlag, 1982.

118. Roe, P.L., "Approximate Riemann Solvers, Parameter Vector, and Difference Schemes," *J. Computational Physics*, Vol. 43, Oct. 1981, pp. 357-372.

119. Liou, M.-S., "A Continuing Search for a Near-Perfect Numerical Fluz Scheme Part I: AUSM+," NASA TM-106524, March 1994.

120. Anderson, W.K., Thomas, J.L., and Van Leer, B., "Comparison of Finite Volume Flux Vector Splittings for the Euler Equations," *AIAA J.*, Vol. 24, No. 9, Sept. 1986, pp. 1453-1460.

121. Van Leer, B., Thomas, J.L., Roe, P.L., and Newsome, R.W., "A Comparison of Numerical Flux Formulas for the Euler and Navier-Stokes Equations," AIAA Paper 87-1104, 1987.

122. Whitaker, D.L., Slack, D.C., and Walters, R.W., "Solution Algorithms for the Two-Dimensional Euler Equations on Unstructured Grids," AIAA Paper 90-0697, 1990.

123. Barth, T.J., and Jespersen, D.C., "The Design and Application of Upwind Schemes on Unstructured Meshes," AIAA Paper 89-0366, 1989.

124. Pan, D., and Cheng, J.C., "Upwind Finite Volume Navier-Stokes Computations on Unstructured Grids," *AIAA J.*, Vol. 31, No. 9, Sept. 1993, pp. 1618-1625.

125. Frink, N.T., "Upwind Scheme for Solving the Euler Equations on Unstructured Tetrhedral Meshes," *AIAA J.*, Vol. 30, No. 1, Jan. 1992, pp. 70-77.

126. Barth, T.J., "A 3-D Upwind Euler Solver for Unstructured Grids," AIAA Paper 91-1548, 1991.

127. Mitchell, C.R., "Improved Reconstruction Schemes for the Navier-Stokes Equations on Unstructured Meshes," AIAA Paper 94-0642, 1994.

128. Frink, N.T., "Three-Dimensional Upwind Scheme for Solving the Euler Equations on Unstructured Tetrahedral Grids," Ph.D. Dissertation, Virginia Polytechnic Institute and State University, Sept. 1991.

129. Frink, N.T., "Recent Progress Toward a Three-Dimensional Unstructured Navier-Stokes Flow Solver," AIAA Paper 94-0061, 1994.

130. Anderson, W.K., "Grid Generation and Flow Solution Method for the Euler Equations on Unstructured Grids," NASA TM-4295, 1992.

131. Timoshenko, S., and Goodier, J.N., Theory of Elasticity, McGraw-Hill Book Co., 1951.

132. Reddy, J.N., An Introduction to the Finite Element Method, McGraw-Hill Book Co., 1993.

133. Zienkiewicz, O.C., and Taylor, R.L., The Finite Element Method, Vols. 1 and 2, McGraw-Hill Book Co., 1989.

134. Cook, R.D., Malkus, D.S., and Plesha, M.E., Concepts and Applications of Finite Element Analysis, John Wiley & Sons, 1989.

135. Hou, G.J.-W., Taylor III, A.C., and Korivi, V.M., "Discrete Shape Sensitivity Equations for Aerodynamic Problems," *Int. J. Num. Meth. Engr.*, Vol. 37, 1994, pp. 2251-2266. (see also AIAA Paper 91-2259.)

136. Bischof, C., and Griewank, A., "ADIFOR: A Fortran System for Portable Automatic Differentiation," AIAA Paper 92-4744, Sept. 1992.

137. Green, L.L., Newman, P.A., and Haigler, K.J., "Sensitivity Derivatives for Advanced CFD Algorithms and Viscous Modelling Parameters Via Automatic Differentiation," *J. Comp. Physics*, Vol. 125, 1996, pp. 313-324. (see also AIAA Paper 93-3321.)

138. Green, L.L., Bischof, C., Griewank, A., Haigler, K., and Newman, P.A., "Automatic Differentiation of Advanced CFD Codes With Respect to Wing Geometry Parameters for MDO," 2nd U.S. National Congress on Computational Mechanics, Washington, D.C., Aug. 1993.

139. Hou, G. J.-W., Maroju, V., Taylor III, A.C., Korivi, V.M., and Newman, P.A., "Transonic Turbulent Airfoil Design Optimization Using Automatic Differentiation in Incremental Iterative Form," AIAA Paper 95-1692, June 1995.

140. Sherman, L.L., Taylor III, A.C., Green, L.L., Newman, P.A., Hou, G.J.-W., and Korivi, V.M., "First- and Second-Order Aerodynamic Sensitivity Derivatives Via Automatic Differentiation with Incremental Iterative Methods," *J. Comp. Physics*, Vol. 129, 1994, pp. 307-331. (see also AIAA Paper 94-4262.)

141. Anderson, W.K., Rausch, R.D., and Bonhaus, D.L., “Implicit/Multigrid Algorithms for Incompressible Turbulent Flows on Unstructured Grids,” AIAA Paper 95-1740, 1995.

142. Saad, Y., and Schultz, M.H., "GMRES: A Generalized Minimal Residual Algorithm for Solving Nonsymmetric Linear Systems," *SIAM J. Sci. Stat. Comput.*, Vol. 7, No. 3, July 1986, pp. 856-969.

143. Wigton, L.B., Yu, N.J., and Young, D.P., "GMRES Acceleration of Computaional Fluid Dynamics Codes," AIAA Paper 85-1494, 1985.

144. Venkatakrishnan, V., "Preconditioned Conjugate Gradient Methods for the Compressible Navier Stokes Equations," *AIAA J.*, Vol. 29, No. 7, July 1991, pp. 1092-1100.

145. Whitaker, D.L., "Three-Dimensional Unstructured Grid Euler Computations Using a Fully-Implicit, Upwind Method," *Proc., 11th AIAA Computational Fluid Dynamics Conf.*, AIAA Paper 93-3337, July 1993, pp. 448-461.

146. Ajmani, K., Ng, W.F., and Liou, M., "Generalized Conjugate Gradient Methods for the Navier Stokes Equations," AIAA Paper 91-1556, 1991.

147. Anderson, E., and Saad, Y., "Solving Sparse Trianular Linear Systems on Parallel Computers," *Int. J. of High Speed Comp.*, Vol. 1, No.1, 1989, pp. 73-95.

148. Meijerink, J.A., and van der Vorst, H.A., "Guidlines for the Usage of Incomplete Decompositions in Solving Sets of Linear Equations as They Occur in Practical Problems," *J. Comp. Physics*, Vol. 44, 1981, pp. 134-155.

149. Whitaker, D.L., "Two-Dimensional Euler Computations on a Traingular Mesh Using an Upwind, Finite-Volume Scheme," Ph.D. Dissertation, Virginia Polytechnic Institute and State University, May 1988.

150. Nguyen, D.T., "Finite Element Software for Multidisciplinary Design Optimization," Final Report, Master Constract NAS1-19858, NASA Langley Research Center, 1995.

151. Storaasli, O.O., Nguyen, D.T., and Agarwal, T.K., "A Parallel-Vector Algorithm for Rapid Structural Analysis on High-Performance Computers," NASA TM-102614, 1990.

152. Guruswamy, G. P., "Coupled Finite Difference/Finite-Element Approach for Wing-Body Aeroelasticity," AIAA Paper 92-4680, 1992.

153. Frink, N. T., Pirzadeh, S., and Parikh, P., "An Unstructured-Grid Software System for Solving Complex Aerodynamic Problems," NASA CP-3291, 1995.

154. Venkatakrishnan, V., and Mavriplis, D.J., "Implicit Solvers for Unstructured Meshes," AIAA Paper 91-1537, 1991.

155. Burgreen, G.W., and Baysal, O., "Aerodynamic Shape Optimization Using Preconditioned Conjugate Gradient Methods," *AIAA J.*, Vol. 32, No. 11, Nov. 1994, pp. 2145-2152.

156. Whitaker, D.L., "Three-Dimensional Unstructured Grid Euler Computations Using a Fully-Implicit, Upwind Method," AIAA Paper 93-3337, July 1993.

157. Cuthill, E., and Mckee, G.A., "Reducing the Bandwidth of Sparse Symmetric Matrices," *Proc., ACM National Conf.*, 1969, pp. 157-172.

158. Lui, W-H., and Sherman, A.H., "Comparitive Analysis of the Cuthill-Mckee and Reverse Cuthill-Mckee Ordering Algorithms for Sparse Matrices," *SIAM J. Num. Anal.*, Vol. 13, No. 2, April 1976.

159. Gibbs, N.E., Poole, W.G., and Stockmeyer, P.K., "An Algorithm for Reducing the Bandwidth and Profile of a Sparse Matrix," *SIAM J. Num. Anal.*, Vol. 13, No. 2, April 1976.

160. Choi, K.K., and Seong, H.G., "A Numerical Method for Shape Design Sensitivity Analysis and Optimization of Build-Up Structures," The Optimum Shape: Automated Structural Design, (Eds. J.A. Bennett and M.E. Botkin), Plenum Press, 1986.

161. Huddleston, D.H., and Mastin, C.W., "Optimization of Aerodynamic Designs Using Computational Fluid Dynamics," AGARD CP-463, Paper No. 23, May 1989.

162. Burgreen, G.W., and Baysal, O., "Three-Dimensional Aerodynamic Shape Optimization of Wings Using Discrete Sensitivity Analysis," *AIAA J.*, Vol. 34, No. 9, Sept. 1996, pp.1761-1770.

163. Mortenson, M.E., Geometric Modeling, John Wiley and Sons, 1985.

164. Korivi, V.M., Newman, P.A., and Taylor III, A.C., “Aerodynamic Optimization Studies Using a 3-D Supersonic Euler Code with Efficient Calculation of Sensitivity Derivatives,” AIAA Paper 94-4270, 1994.

165. Batina, J.T., "Unstready Euler Airfoil Solutions Using Unstructured Dynamic Meshes," AIAA Paper 89-0115, 1989.

166. Singh, K.P., Newman III, J.C., and Baysal, O., "Dynamic Unstructured Method for Flows Past Multiple Objects in Relative Motion," *AIAA J.*, Vol. 33, 1995, pp.641-649.

167. Venkatakrishnan, V., and Mavriplis, D.J., “Implicit Method for the Computation of Unsteady Flows on Unstructured Grids,” ICASE Report No. 95-60, Aug. 1995.

168. Taylor III, A.C., Korivi, V.M., and Hou, G.J.-W., “Sensitivity Analysis Applied to the Euler Equations: A Feasibility Study with Emphasis on Variation of Geometric Shape,” AIAA Paper 91-0173, 1991.

169. Whitcomb, R.T., “Review of NASA Supercritical Airfoils,” ICAS Paper No. 74-20, Aug. 1974.

170. Harris, C.D., “NASA Supercritical Airfoils,” NASA TP-2969, March 1990.

171. Olason, M.L., and Norton, D.A., “Aerodynamic Design Philosophy of the Boeing 737,” J. Aircraft, Vol. 3, 1966, pp. 524-528.

172. Hoffmann, K.A., and Chiang, S.T., Computational Fluid Dynamics for Engineers, Engineering Education System, 1993.

173. Anderson, D.A., Tannehill, J.C., and Pletcher, R.H., Computational Fluid Mechanics and Heat Transfer, McGraw-Hill Book Company, 1984.