

References

1. Alalykin, G.B., Godunov, S.K., Kireyeva, L.L., Pliner, L.A. (1970): *On Solution of One-Dimensional Problems of Gas Dynamics in Moving Grids*. Nauka, Moscow (Russian)
2. Albone, C.M. (1992): Embedded meshes of controllable quality synthesised from elementary geometric features. AIAA Paper 92-0633
3. Albone, C.M., Joyce, M.G. (1990): Feature-associated mesh embedding for complex configurations. AGARD Conference Proceedings 464.13
4. Allwright, S. (1989): Multiblock topology specification and grid generation for complete aircraft configurations. In Schmidt, W. (ed.): *AGARD Conference Proceedings 464, Applications of Mesh Generation to Complex 3-D Configurations*. Loen, Norway. Advisory Group for Aerospace Research and Development, NATO
5. Amsden, A.A., Hirt, C.W. (1973): A simple scheme for generating general curvilinear grids. *J. Comput. Phys.* 11, 348–359
6. Anderson, D.A. (1983): Adaptive grid methods for partial differential equations. In Ghia, K.N., Ghia U. (eds.): *Advances in Grid Generation*. ASME, Houston, pp. 1–15
7. Andrews, A.E. (1988): Progress and challenges in the application of artificial intelligence to computational fluid dynamics. *AIAA Journal* 26, 40–46
8. Arina, R., Casella, M. (1991): A harmonic grid generation technique for surfaces and three-dimensional regions. In Arcilla, A.S., Hauser, J., Eiseman, P.R., Thompson, J.F. (eds.): *Numerical Grid Generation in Computational Fluid Dynamics and Related Fields*. North-Holland, New York, pp. 935–946
9. Atta, E.H., Vadyak, J. (1982): A grid interfacing zonal algorithm for three-dimensional transonic flows about aircraft configurations. AIAA Paper 82-1017
10. Atta, E.H., Birchelbaw, L., Hall, K.A. (1987): A zonal grid generation method for complex configurations. AIAA Paper 87-0276
11. Azarenok, B.N. (2000): Realization of second-order Godunov's scheme. *Comp. Meth. in Appl. Mech. and Engin.*, 189, pp. 1031–1052.
12. Azarenok, B.N. (2002): Variational barrier method of adaptive grid generation in hyperbolic problems of gas dynamics. *SIAM J. Numer. Anal.*, 40(40), pp. 651–682.
13. Azarenok, B.N., Tang, T. (2005): Second-order Godunov-type scheme for reactive flow calculations on moving meshes. *J. Comput. Phys.*, 206, pp. 48–80.

14. Baker, T.J. (1995): Prospects and expectations for unstructured methods. In: *Proceedings of the Surface Modeling, Grid Generation and Related Issues in Computational Fluid Dynamics Workshop*. NASA Conference Publication 3291, NASA Lewis Research Center, Cleveland, OH, pp. 273–287
15. Baker, T.J. (1997): Mesh adaptation strategies for problems in fluid dynamics. *Finite Elements Anal. Design*. 25, 243–273
16. Bakhvalov, N.S. (1969): On optimization of the methods of the numerical solution of boundary-value problems with boundary layers. *J. Comput. Math. Math. Phys.* 9(4), 842–859 (Russian) [English transl.: *USSR Comput. Math. and Math. Phys.* 9 (1969)]
17. Barfield, W.D. (1970): An optimal mesh generator for Lagrangian hydrodynamic calculations in two space dimensions. *J. Comput. Phys.* 6, 417–429
18. Belinsky, P.P., Godunov, S.K., Ivanov, Yu.V., Yanenko I.K. (1975): The use of one class of quasiconformal mappings to generate numerical grids in regions with curvilinear boundaries. *Zh. Vychisl. Maths. Math. Fiz.* 15, 1499–1511 (Russian)
19. Belk, D.M., Whitefield, D.L. (1987): Three-dimensional Euler solutions on blocked grids using an implicit two-pass algorithms. *AIAA Paper 87-0450*
20. Bell, J.B., Shubin, G.R. (1983): An adaptive grid finite-difference method for conservation laws. *J. Comput. Phys.* 52, 569–591
21. Benek, J.A., Buning, P.G., Steger, J.L. (1985): A 3-d chimera grid embedding technique. *AIAA Paper 85-1523*
22. Benek, J.A., Steger, J.L., Dougherty, F.C. (1983): A flexible grid embedding technique with application to the Euler equations. *AIAA Paper 83-1944*
23. Berger, M.J., Olinger, J. (1983): Adaptive mesh refinement for hyperbolic partial differential equations. Manuscript NA-83-02, Stanford University, March
24. Brackbill, J.U. (1993): An adaptive grid with directional control. *J. Comput. Phys.* 108, 38–50
25. Brackbill, J.U., Saltzman, J. (1982): Adaptive zoning for singular problems in two directions. *J. Comput. Phys.* 46, 342–368
26. Carey, G.F. (1997): *Computational Grids. Generation, Adaptation, and Solution Strategies*. Taylor and Francis, London
27. Chan, W.M., Buning, P.G. (1995): Surface grid generation methods for overset grids. *Computer and Fluids*. 24(5), 509–522
28. Chan, W.M., Steger, L.G. (1992): Enhancement of a three-dimensional hyperbolic grid generation scheme. *Appl. Maths. Comput.* 51(1), 181–205
29. Charakch'yan, A.A. (1993): Almost conservative difference schemes for the equations of gas dynamics. *Comput. Math. Math. Phys.* 33, 1473
30. Charakch'yan, A.A. (1994): Compound difference schemes for time-dependent equations on non-uniform nets. *Commun. Numer. Methods. Eng.* 10, 93
31. Charakch'yan, A.A., Ivanenko, S.A. (1997): A variational form of the Winslow grid generator. *J. Comput. Phys.* 136, 385–398

32. Chiba, N., Nishigaki, I., Yamashita, Y., Takizawa, C., Fujishiro, K. (1998): A flexible automatic hexahedral mesh generation by boundary-fit method. *Comput. Methods Appl. Mech. Engng.* 161, 145–154
33. Chu, W.H. (1971): Development of a general finite difference approximation for a general domain. *J. Comput. Phys.* 8, 392–408
34. Chumakov, G.A., Chumakov, S.G. (1998): A method for the 2-D quasi-isometric regular grid generation, *J. Comput. Phys.* 133, 1–28
35. Colella, P., Woodward, P.R. (1984): The numerical simulation of two-dimensional fluid flow with strong shocks, *J. Comput. Phys.* 54, 115–173
36. Cordova, J.Q., Barth, T.J. (1988): Grid generation for general 2-D regions using hyperbolic equations, AIAA Paper 88-0520
37. Crowley, W.P. (1962): An equipotential zoner on a quadrilateral mesh. Memo, Lawrence Livermore National Lab., 5 July 1962
38. Danaev, N.T., Liseikin, V.D., Yanenko, N.N. (1980): Numerical solution on a moving curvilinear grid of viscous heat-conducting flow about a body of revolution. *Chisl. Metody Mekhan. Sploshnoi Sredy* 11(1), 51–61 (Russian)
39. Dannenhoffer, J.F. (1995): Automatic blocking for complex three-dimensional configurations. In: *Proceedings of the Surface Modeling, Grid Generation, and Related Issues in Computational Fluid Dynamics Workshop*. NASA Lewis Research Center, Cleveland OH, May, p. 123
40. Dvinsky, A.S. (1991): Adaptive Grid Generation from Harmonic Maps on Riemannian Manifolds. *J. Comput. Phys.* 95, 450–476
41. Edwards, T.A. (1985): Noniterative three-dimensional grid generation using parabolic partial differential equations. AIAA Paper 85-0485
42. Eells, J., Lemaire, L. (1988): Another report on harmonic maps. *Bull. London Math. Soc.* 20(5), 385–524
43. Eiseman, P.R. (1980): Geometric methods in computational fluid dynamics. ICASE Report 80-11 and Von Karman Institute for Fluid Dynamics Lecture Series Notes
44. Eiseman, P.R. (1985): Grid generation for fluid mechanics computations. *Ann. Rev. Fluid Mech.* 17, 487–522
45. Eiseman, P.R. (1987): Adaptive grid generation. *Comput. Methods. Appl. Mech. Engng.* 64, 321–376
46. Eriksson, L.E. (1982): Generation of boundary-conforming grids around wing-body configurations using transfinite interpolation. *AIAA Journal* 20, 1313–1320
47. Eriksson, L.E. (1983): Practical three-dimensional mesh generation using transfinite interpolation. Lecture Series Notes 1983-04, von Karman Institute for Fluid Dynamics, Brussels
48. Farrel, F.T., Jones, L.E. (1996): Some non-homeomorphic harmonic homotopy equivalences. *Bull. London Math. Soc.*, 28, 177–182
49. Field, D.A. (1995): The legacy of automatic mesh generation from solid modeling. *Comp. Aided Geom. Design* 12, 651–673
50. Fletcher C.A.J. (1997): *Computational Techniques for Fluid Dynamics 1: Fundamental and General Techniques*. Springer, Berlin
51. Fomenko, A.T., Thi, D.T. (1991): *Minimal surfaces, stratified multi-varifolds, and the Plateau problem*. AMS, New York

52. Georgala, J.M., Shaw, J.A. (1989): A discussion on issues relating to multiblock grid generation. In Schmidt, W. (ed.): *AGARD Conference Proceedings 464, Applications of Mesh Generation to Complex 3-D Configurations*. Loen, Norway. Advisory Group for Aerospace Research and Development, NATO
53. George, P.L., Borouchaki, H. (1998): *Delaunay Triangulation and Meshing*. Editions Hermes, Paris
54. Ghia, K.N., Ghia, U., Shin, C.T. (1983): Adaptive grid generation for flows with local high gradient regions. In Ghia, K.N., Ghia, U. (eds.): *Advances in Grid Generation*. ASME, Houston TX, pp. 35–47
55. Giannakopoulos, A.E., Engel, A.J. (1988): Directional control in grid generation. *J. Comput. Phys.* 74, 422–439
56. Glasser, A.H., Liseikin, V.D., Kitaeva, I.A. (2005): Control of grid properties with the help of monitor metrics. *Comput. Math. Math. Phys.*, 45(8), 1416–1432
57. Glasser, A.H., Kitaeva, I.A., Yu.V. Likhanova, Liseikin, V.D., Lukin, V.S. (2005): Specification of monitor metrics for generating balanced numerical grids. *Joint Bulletin of NCC and IIS, Numerical Analysis*, 13, 1–13
58. Glasser, A.H., Tang, X.Z. (2004): The SEL macroscopic modeling code. *Comp. Phys. Comm.*, 164, 237–243
59. Godunov, S.K., Prokopov, G.P. (1967): Calculation of conformal mappings in the construction of numerical grids. *J. Comput. Maths. Math. Phys.* 7, 1031–1059 (Russian)
60. Godunov, S.K., Prokopov, G.P. (1972): On utilization of moving grids in gasdynamics computations. *J. Vychisl. Matem. Matem. Phys.* 12, 429–440 (Russian) [English transl.: *USSR Comput. Math. and Math. Phys.* 12 (1972), 182–195]
61. Godunov, S.K., Romenskii, E.I., Chumakov, G.A. (1990): Grid generation in complex domains by means of quasi-conformal mappings. *Proc. Institute of Mathematics, Novosibirsk, Nauka*, 18, 75–84 (Russian)
62. Gordon, W.J., Hall, C.A. (1973): Construction of curvilinear coordinate systems and applications to mesh generation. *Int. J. Numer. Meth. Engng.* 7, 461–477
63. Gordon, W.J., Thiel, L.C. (1982): Transfinite mappings and their application to grid generation. In Thompson, J.F. (ed.): *Numerical Grid Generation*. North-Holland, New York, pp. 171–192
64. Hawken, D.F., Gottlieb, J.J., Hansen, J.S. (1991): Review of some adaptive node-movement techniques in finite-element and finite-difference solutions of partial differential equations. *J. Comput. Phys.* 95, 254–302
65. Hedstrom, G.W., Rodrigue C.M. (1982): Adaptive-grid methods for time-dependent partial differential equations. *Lect. Notes Math.* 960, 474–484
66. Ho-Le (1988): Finite element mesh generation methods: a review and classification. *Computer-Aided Design* 20, 27–38
67. Holcomb, J.F. (1987): Development of a grid generator to support 3-dimensional multizone Navier–Stokes analysis. *AIAA Paper 87-0203*
68. Huang, W. (2001): Variational mesh adaptation: isotropy and equidistribution. *J. Comput. Phys.* 174, 903–924

69. Huang, W., Ren, Y., Russel, R.D. (1994): Moving mesh PDEs based on the equidistribution principle. *SIAM J. Numer. Anal.* 31, 709–730
70. Ivanenko, S.A. (1988): Generation of non-degenerate meshes. *USSR Comput. Math. Math. Phys.* 28(5), 141
71. Ivanenko, S.A., Charakh'yan, A.A. (1988): An algorithm for constructing curvilinear grids consisting of convex quadrangles. *Soviet. Math. Dokl.* 36(1), 51
72. Jacquotte, O.-P. (1987): A mechanical model for a new grid generation method in computational fluid dynamics. *Comput. Meth. Appl. Mech. Engng.* 66, 323–338
73. Jeng, Y.N., Shu, Y.-L. (1995): Grid combination method for hyperbolic grid solver in regions with enclosed boundaries. *AIAA Journal* 33(6), 1152–1154
74. Khakimzyanov, G.S., Shokin, Yu.I., Barakhnin, V.B., Shokin, N.Yu. (2001): *Numerical Modeling of Flows with Surface Waves*. Novosibirsk, Siberian Division of the Russian Academy of Sciences
75. Khamayseh, A., Mastin, C.W. (1996): Computational conformal mapping for surface grid generation. *J. Comput. Phys.* 123, 394–401
76. Kim, B., Eberhardt, S.D. (1995): Automatic multiblock grid generation for high-lift configuration wings. *Proceedings of the Surface Modeling, Grid Generation, and Related Issues in Computational Fluid Dynamics Workshop*. NASA, Lewis Research Center, Cleveland OH, May, p. 671
77. Knupp, P., Steinberg, S. (1993): *Fundamentals of Grid Generation*. CRC Press, Boca Raton
78. Kovenya, V.M., Tarnavskii, G.A., Chernyi S.G. (1990): *Application of a Splitting Method to Fluid Problems*. Nauka, Novosibirsk (in Russian)
79. Krugljakova, L.V., Neledova, A.V., Tishkin, V.F., Filatov, A.Yu. (1998): Unstructured adaptive grids for problems of mathematical physics (survey). *Math. Modeling* 10(3), 93–116 (Russian)
80. Langtangen (2003): *Computational Partial Differential Equations. Numerical Methods and Diffpack Programming*. Springer, Berlin
81. Lee, K.D., Loellbach, J.M. (1989): Geometry-adaptive surface grid generation using a parametric projection. *J. Aircraft* 2, 162–167
82. Lee, K.D., Huang, M., Yu, N.J., Rubbert, P.E. (1980): Grid generation for general three-dimensional configurations. In Smith, R.E. (ed.): *Proc. NASA Langley Workshop on Numerical Grid Generation Techniques*. Oct., p. 355
83. Liao, G. (1991): On harmonic maps. In Castilio, J.E. (ed.): *Mathematical Aspects of Numerical Grid Generation*. Frontiers in Applied Mathematics, 8. SIAM, Philadelphia, pp. 123–130
84. Lin, K.L., Shaw, H.J. (1991): Two-dimensional orthogonal grid generation techniques. *Comput. Struct.* 41(4), 569–585
85. Liseikin, V.D. (1991a): On generation of regular grids on n -dimensional surfaces. *J. Comput. Math. Math. Phys.* 31, 1670–1689 (Russian). [English transl.: *USSR Comput. Math. Math. Phys.* 31(11) (1991), 47–57]
86. Liseikin, V.D. (1991b): Techniques for generating three-dimensional grids in aerodynamics (review). *Problems Atomic Sci. Technology. Ser. Math. Model. Phys. Process* 3, 31–45 (Russian)
87. Liseikin, V.D. (1992): On a variational method of generating adaptive grids on n -dimensional surfaces. *Soviet Math. Docl.* 44(1), 149–152

88. Liseikin, V.D. (1996): Construction of structured adaptive grids – a review. *Comput. Math. Math. Phys.*, 36(1), 1–32
89. Liseikin, V.D. (1998a): Algebraic adaptation based on stretching functions. *Russ. J. Numer. Anal. Math. Modeling* 13(4), 307–324
90. Liseikin, V.D. (1998b): A method of algebraic adaptation. *Comput. Math. Math. Phys.*, 38(10), 1624–1640
91. Liseikin, V.D. (1999): *Grid Generation Methods*. Springer, Berlin
92. Liseikin, V.D. (2001a): *Layer Resolving Grids and Transformations for Singular Perturbation Problems*. VSP, Utrecht
93. Liseikin, V.D. (2001b): Application of notions and relations of differential geometry to grid generation. *Russ. J. Numer. Anal. Math. Modeling* 16(1), 57–75
94. Liseikin, V.D. (2002a): Analysis of grids derived by a comprehensive grid generator. *Russ. J. Numer. Anal. Math. Modeling* 17(2), 183–202
95. Liseikin, V.D. (2002b): On geometric analysis of grid properties. *Russ. Docl. Acad. Nauk* 383(2), 167–170
96. Liseikin, V.D. (2003): On analysis of clustering of numerical grids produced by elliptic models. *Russ. J. Numer. Anal. Math. Modeling* 18(2), 159–183
97. Liseikin, V.D. (2004): *A Computational Differential Geometry Approach to Grid Generation*. Springer, Berlin
98. Liseikin, V.D. (2005): On a universal monitor metric for numerical grid generation. *Doklady Mathematics* 71(1), 15–19
99. Liseikin, V.D., Yanenko N.N. (1977): Selection of optimal numerical grids. *Chisl. Metody Mekhan. Sploshnoi Sredy* 8(7), 100–104 (Russian)
100. Lomonosov, I.V., Frolova, A.A., Charakhch'yan, A.A., (1997): Computation of high-velocity impact of thin foil upon conical target (survey). *Math. Modeling* 9(5), 48–60 (Russian)
101. Mastin, C.W. (1992): Linear variational methods and adaptive grids. *Computers Math. Applic.* 24(5/6), 51–56
102. McNally, D. (1972): FORTRAN program for generating a two-dimensional orthogonal mesh between two arbitrary boundaries. NASA, TN D-6766, May
103. Miki, K., Takagi, T. (1984): A domain decomposition and overlapping method for the generation of three-dimensional boundary-fitted coordinate systems. *J. Comput. Phys.* 53, 319–330
104. Nakamura, S. (1982): Marching grid generation using parabolic partial differential equations. *Appl. Math. Comput.* 10(11), 775–786
105. Nakamura, S., Suzuki M. (1987): Noniterative three-dimensional grid generation using a parabolic-hyperbolic hybrid scheme. *AIAA Paper* 87-0277
106. Noack, R.W. (1985): Inviscid flow field analysis of maneuvering hypersonic vehicles using the SCM formulation and parabolic grid generation. *AIAA Paper* 85-1682
107. Noack, R.W., Anderson D.A. (1990): Solution adaptive grid generation using parabolic partial differential equations: *AIAA Journal* 28(6), 1016–1023
108. Petracic, M. (1987): Orthogonal grid construction for modeling of transport in Tokamaks. *J. Comput. Phys.* 73, 125–130

109. Reed, C.W., Hsu, C.C., Shiau, N.H. (1988): An adaptive grid generation technique for viscous transonic flow problems. AIAA Paper 88-0313
110. Rizk, Y.M., Ben-Shmuel, S. (1985): Computation of the viscous flow around the shuttle orbiter at low supersonic speeds. AIAA Paper 85-0168
111. Rognlien, T.D., Xu, X.Q., Hinmarsh A.C. (2002): Application of parallel implicit methods to edge-plasma numerical simulations. *J. Comput. Phys.*, 175, 249–268
112. Rubbert, P.E., Lee, K.D. (1982): Patched coordinate systems. In Thompson, J.F. (ed.): *Numerical Grid Generation*, North-Holland, New York, p. 235
113. Ryskin, G., Leal, L.G. (1983): Orthogonal mapping. *J. Comput. Phys.* 50(3), 71–100
114. Schonfeld, T., Weinerfelt, P., Jenssen, C.B. (1995): Algorithms for the automatic generation of 2d structured multiblock grids. *Proceedings of the Surface Modeling, Grid Generation, and Related Issues in Computational Fluid Dynamics Workshop*. NASA, Lewis Research Center, Cleveland OH, May, p. 561
115. Shaw, J.A., Weatherill, N.P. (1992): Automatic topology generation for multiblock grids. *Appl. Math. Comput.* 52, 355–388
116. Shephard, M.S., Grice, K.R., Lot, J.A., Schroeder, W.J. (1988): Trends in automatic three-dimensional mesh generation. *Comput. Struct.* 30(1/2), 421–429
117. Smith, R.E. (1981): Two-boundary grid generation for the solution of the three-dimensional Navier–Stokes equations. NASA TM-83123
118. Smith, R.E. (1982): Algebraic grid generation. In Thompson, J.F. (ed.): *Numerical Grid Generation*. North-Holland, New York, pp. 137–170
119. Smith, R.E., Eriksson, L.E. (1987): Algebraic grid generation. *Comp. Meth. Appl. Mech. Eng.* 64, 285–300
120. Sorenson, R.L. (1986): Three-dimensional elliptic grid generation about fighter aircraft for zonal finite-difference computations. AIAA Paper 86-0429
121. Sparis, P.D. (1985): A method for generating boundary-orthogonal curvilinear coordinate systems using the biharmonic equation. *J. Comput. Phys.* 61(3), 445–462
122. Starius, G. (1977): Constructing orthogonal curvilinear meshes by solving initial value problems. *Numer. Math.* 28, 25–48
123. Steger, J.L. (1991): Grid generation with hyperbolic partial differential equations for application to complex configurations. In Arcilla, A.S., Hauser, J., Eiseman, P.R., Thompson, J.F. (eds.): *Numerical Grid Generation in Computational Fluid Dynamics and Related Fields*. North-Holland, New York, pp. 871–886
124. Steger, J.L., Chaussee, D.S. (1980): Generation of body fitted coordinates using hyperbolic differential equations. *SIAM. J. Sci. Stat. Comput.* 1(4), 431–437
125. Steger, J.L., Rizk, Y.M. (1985): Generation of three-dimensional body-fitted coordinates using hyperbolic partial differential equations. NASA, TM 86753, June

126. Steger, J.L., Sorenson, R.L. (1979): Automatic mesh-point clustering near a boundary in grid generation with elliptic partial differential equations. *J. Comput. Phys.* 33, 405–410
127. Steinberg, S., Roache, P.J. (1986): Variational grid generation. *Numer. Meth. Partial Differential Equations* 2, 71–96
128. Steinbrenner, J.P., Chawner, J.R., Fouts, C.L. (1990): Multiple block grid generation in the interactive environment. *AIAA Paper* 90-1602
129. Stewart, M.E.M. (1992): Domain decomposition algorithm applied to multielement airfoil grids. *AIAA Journal* 30(6), 1457
130. Tai, C.H., Chiang, D.C., Su, Y.P. (1996): Three-dimensional hyperbolic grid generation with inherent dissipation and Laplacian smoothing. *AIAA Journal* 34(9), 1801–1806
131. Takagi, T., Miki, K., Chen, B.C.J., Sha, W.T. (1985): Numerical generation of boundary-fitted curvilinear coordinate systems for arbitrarily curved surfaces. *J. Comput. Phys.* 58, 69–79
132. Takahashi, H., Shimizu, H. (1991): A general purpose automatic mesh generation using shape recognition technique. *Comput. Engng. ASME* 1, 519–526
133. Tamamidis, P., Assanis, D.N. (1991): Generation of orthogonal grids with control of spacing. *J. Comput. Phys.* 94, 437–453
134. Thacker, W.C. (1980): A brief review of techniques for generating irregular computational grids. *Int. J. Numer. Meth. Engng.* 15(9), 1335–1341
135. Thoman, D.C., Szewczyk, A.A. (1969): Time-dependent viscous flow over a circular cylinder. *Phys. Fluids Suppl.* II, 76
136. Thomas, P.D. (1982): Composite three-dimensional grids generated by elliptic systems. *AIAA Journal* 20(9), 1195–1202
137. Thomas, P.D., Middlecoff, J.F. (1980): Direct control of the grid point distribution in meshes generated by elliptic equations. *AIAA Journal* 18(6), 652–656
138. Thomas, M.E., Bache, G.E., Blumenthal, R.F. (1990): Structured grid generation with PATRAN. *AIAA Paper* 90-2244
139. Thompson, J.F. (1984a): Grid generation techniques in computational fluid dynamics. *AIAA Journal* 22(11), 1505–1523
140. Thompson, J.F. (1984b): A survey of dynamically-adaptive grids in the numerical solution of partial differential equations. *AIAA Paper* 84-1606
141. Thompson, J.F. (1985): A survey of dynamically-adaptive grids in the numerical solution of partial differential equations. *Appl. Numer. Math.* 1, 3–27
142. Thompson, J.F. (1987): A general three-dimensional elliptic grid generation system on a composite block structure. *Comput. Meth. Appl. Mech. Engng.* 64, 377–411
143. Thompson, J.F. (1996): A reflection on grid generation in the 90s: trends, needs influences. In Soni, B.K., Thompson, J.F., Hauser, J., Eiseman, P.R. (eds.): *Numerical Grid Generation in CFD*. Mississippi State University, 1, pp. 1029–1110
144. Thompson, J.F., Weatherill, N.P. (1993): Aspects of numerical grid generation: current science and art. *AIAA Paper* 93-3539

145. Thompson, J.F., Thames, F.C., Mastin, C.W. (1974): Automatic numerical generation of body-fitted curvilinear coordinate system for field containing any number of arbitrary two-dimensional bodies. *J. Comput. Phys.* 15, 299–319
146. Thompson, J.F., Warsi, Z.U.A., Mastin C.W. (1982): Boundary-fitted coordinate systems for numerical solution of partial differential equations – a review. *J. Comput. Phys.* 47, 1–108
147. Thompson, J.F., Warsi, Z.U.A., Mastin C.W. (1985): *Numerical Grid Generation. Foundations and Applications*. North-Holland, New York
148. Visbal, M., Knight, D. (1982): Generation of orthogonal and nearly orthogonal coordinates with grid control near boundaries. *AIAA Journal* 20(3), 305–306
149. Vogel, A.A. (1990): Automated domain decomposition for computational fluid dynamics. *Computers and Fluids* 18(4), 329–346
150. Warsi, Z.U.A. (1981): *Tensors and Differential Geometry Applied to Analytic and Numerical Coordinate Generation*. MSSU-EIRS-81-1, Aerospace Engineering, Mississippi State University
151. Warsi, Z.U.A. (1982): Basic differential models for coordinate generation. In Thompson, J.F. (ed.): *Numerical Grid Generation*. North-Holland, New York, pp. 41–78
152. Warsi, Z.U.A. (1986): Numerical grid generation in arbitrary surfaces through a second-order differential-geometric model. *J. Comput. Phys.* 64, 82–96
153. Warsi, Z.U.A. (1990): Theoretical foundation of the equations for the generation of surface coordinates. *AIAA Journal* 28(6), 1140–1142
154. Warsi, Z.U.A., Thompson, J.F. (1990): Application of variational methods in the fixed and adaptive grid generation. *Comput. Math. Appl.* 19(8/9), 31–41
155. Weatherill, N.P., Forsey, C.R. (1984): Grid generation and flow calculations for complex aircraft geometries using a multi-block scheme. *AIAA Paper* 84-1665
156. White, A.B. (1990): Elliptic grid generation with orthogonality and spacing control on an arbitrary number of boundaries. *AIAA Paper* 90-1568
157. Widhopf, G.D., Boyd, C.N., Shiba, J.K., Than, P.T., Oliphant, P.H., Huang, S-C., Swedberg, G.D., Visich, M. (1990): RAMBO-4G: An interactive general multiblock grid generation and graphics package for complex multibody CFD applications. *AIAA Paper* 90-0328
158. Winslow, A.M. (1967): Equipotential zoning of two-dimensional meshes. *J. Comput. Phys.* 1, 149–172
159. Winslow, A.M. (1981): Adaptive mesh zoning by the equipotential method. UCID-19062, Lawrence Livermore National Laboratories
160. Wulf, A., Akrag, V. (1995): Tuned grid generation with ICEM CFD. *Proceedings of the Surface Modeling, Grid Generation, and Related Issues in Computational Fluid Dynamics Workshop*. NASA, Lewis Research Center, Cleveland OH, May, p. 477
161. Yanenko, N.N. (1971): *The Method of Fractional Steps. The Solution of Problems of Mathematical Physics in Several Variables*. Springer, Berlin.

162. Yanenko, N.N., Danaev, N.T., Liseikin, V.D. (1977): A variational method for grid generation. *Chisl. Metody Mekhan. Sploshnoi Sredy* 8(4), 157–163 (Russian)
163. Zegeling, P.A. (1993): *Moving-Grid Methods for Time-Dependent Partial Differential Equations*. CWI Tract 94, Centrum voor Wiskund en Informatica, Amsterdam

Index

- Arc length parameter 56
- Basic
 - normal vector 65
 - parallelepiped 64
 - vector 64
- Beltrami's parameter
 - first 81
 - mixed 81
 - second 82
 - second differential 120
- Beltramian operator 119
- Calculus of variation 42
- Cell
 - deformation 10, 31
 - edge 9
 - reference 8
 - standard 9
 - volume 261
- Christoffel symbols 50
 - of the first kind 51, 71
 - of the second kind 51, 71, 134
- Code 32
- Compatibility 12
- Consistent discretization 11
- Coordinate
 - Cartesian 19, 135
 - curvilinear 61
 - grid 118, 122
 - hypersurface 62
 - Lagrangian 261
 - line 62
 - local system 69
 - logical 118
 - orthogonal 51
 - parametric 119
- Covariant derivative 77
- Critical point 134
- Curvature
 - Gaussian 90
 - geodesic 85
 - mean 85, 90, 108
 - principal 107, 112
- Curve
 - length 43
 - parametrization 43, 55
 - quality 55
- Cylindrical block 257
- Domain
 - decomposition 32
 - parametric 35, 118
 - physical 10
- Energy density 134
- Equation
 - algebraic 10
 - boundary layer 261
 - diffusion 128
 - fluxes-sources 165
 - gas-dynamics 247
 - generalized Laplace 122
 - hyperbolic 26
 - inverted 161
 - Navier–Stokes 261
 - parabolic 24
 - parametric 61
 - Poisson 24, 155
 - Serret–Frenet 57
- Equidistribution principle 124
- Euclidean
 - metric 135
 - space 135
- Euler theorem 11
- Function

- admissible 29
- blending 23
- control 25
- exponential 267
- harmonic 134
- layer-type 267
- logarithmic 267
- monitor 70, 71
- power 267
- weight 71, 124
- Functional
 - descrete 238
 - diffusion 139
 - energy 134
 - of grid smoothness 134
- Fundamental form
 - first 64
 - second 90, 106
- Gauss relation 51
- Grid
 - balanced 158
 - block-structured 257
 - boundary-conforming 12, 19
 - boundary-fitting 12
 - Cartesian 19
 - coordinate 18, 19
 - deformation 10
 - field-aligned 151
 - moving 19
 - multi-block 255
 - nodes 8
 - organization 12
 - quality 22
 - size 10
 - smoothing 263
 - structured 18, 19
 - topology 258, 259
- Intermediate transformation 120
- Intersection 107
- Intrinsic geometry 63
- Inverse 36, 40, 56
- Jacobi matrix 35
- Jacobian 38
- Layer width 268
- Left-handed orientation 38
- Length 56
- Manifold
 - monitor 71, 119, 141
 - Riemannian 68
- Mapping approach 17, 118
- Maximum principle 24
- Measure
 - of grid nonalignment 152
 - of grid nonuniformity 154
 - of line bending 58
 - of relative clustering 84
 - of relative spacing 83
- Method
 - algebraic 22
 - differential 22
 - finite-difference 12
 - finite-volume 12
 - hybrid grid 28
 - hyperbolic 27
 - minimization of functional 236, 239
 - variational 22
- Metric
 - diagonal 130
 - monitor 140
 - spherical 130
- Orthonormal basis 58
- Problem
 - boundary value 129
 - well-posed 28
- Product
 - cross 46
 - dot 38
 - tensor 49
- Radius of curvature 57
- Rate of twisting 59
- Right-handed orientation 38
- Source term 25
- Specification
 - explicit 5
 - implicit 5
- Surface
 - minimal 108
 - monitor 70, 108, 136
 - multidimensional 61
 - regular 61

- warping 107
- Tangent n -dimensional plane 62
- Tensor
 - component 75
 - contravariant 65, 76
 - contravariant metric 44
 - covariant 75
 - covariant metric 42, 63
 - invariant 81
 - metric 38
 - mixed 76
 - of mixed derivatives 77
 - of order zero 75
 - product 86
- rank 75
 - surface metric 63
- Torsion 58, 59
- Triad 48
- Turbulence 10, 261
- Vector
 - basic 88
 - basic normal 63
 - binormal 57
 - curvature 56
 - normal 39, 49, 63
 - tangent 62
 - tangential 37, 38, 55
 - unit normal 85

Scientific Computation

A Computational Method in Plasma Physics

F. Bauer, O. Betancourt, P. Garabedian

Implementation of Finite Element Methods for Navier–Stokes Equations

F. Thomasset

Finite-Different Techniques for Vectorized Fluid Dynamics Calculations

Edited by D. Book

Unsteady Viscous Flows

D. P. Telionis

Computational Methods for Fluid Flow

R. Peyret, T. D. Taylor

Computational Methods in Bifurcation Theory and Dissipative Structures

M. Kubicek, M. Marek

Optimal Shape Design for Elliptic Systems

O. Pironneau

The Method of Differential Approximation

Yu. I. Shokin

Computational Galerkin Methods

C. A. J. Fletcher

Numerical Methods

for Nonlinear Variational Problems

R. Glowinski

Numerical Methods in Fluid Dynamics

Second Edition M. Holt

Computer Studies of Phase Transitions and Critical Phenomena

O. G. Mouritsen

Finite Element Methods in Linear Ideal Magnetohydrodynamics

R. Gruber, J. Rappaz

Numerical Simulation of Plasmas

Y. N. Dnestrovskii, D. P. Kostomarov

Computational Methods for Kinetic Models of Magnetically Confined Plasmas

J. Killeen, G. D. Kerbel, M. C. McCoy,

A. A. Mirin

Spectral Methods in Fluid Dynamics

Second Edition

C. Canuto, M. Y. Hussaini,

A. Quarteroni, T. A. Zang

Computational Techniques for Fluid Dynamics 1

Fundamental and General Techniques

Second Edition

C. A. J. Fletcher

Computational Techniques for Fluid Dynamics 2

Specific Techniques for Different Flow Categories
Second Edition

C. A. J. Fletcher

Methods for the Localization of Singularities in Numerical Solutions of Gas Dynamics Problems

E. V. Vorozhtsov, N. N. Yanenko

Classical Orthogonal Polynomials of a Discrete Variable

A. F. Nikiforov, S. K. Suslov, V. B. Uvarov

Flux Coordinates and Magnetic Field Structure: A Guide to a Fundamental Tool of Plasma Theory

W. D. D'haeseleer, W. N. G. Hitchon,

J. D. Callen, J. L. Shohet

Monte Carlo Methods in Boundary Value Problems

K. K. Sabelfeld

The Least-Squares Finite Element Method Theory and Applications in Computational

Fluid Dynamics and Electromagnetics

Bo-nan Jiang

Computer Simulation of Dynamic Phenomena

M. L. Wilkins

Grid Generation Methods

V. D. Liseikin

Radiation in Enclosures

A. Mbiok, R. Weber

Higher-Order Numerical Methods for Transient Wave Equations

G. C. Cohen

Fundamentals of Computational Fluid Dynamics

H. Lomax, T. H. Pulliam, D. W. Zingg

The Hybrid Multiscale Simulation Technology

An Introduction with Application to Astrophysical and Laboratory Plasmas

A. S. Lipatov

Computational Aerodynamics and Fluid Dynamics

An Introduction J.-J. Chattot

Nonclassical Thermoelastic Problems in Nonlinear Dynamics of Shells Applications of the Bubnov–Galerkin and Finite Difference Numerical Methods

J. Awrejcewicz, V. A. Krysko

Scientific Computation

**A Computational Differential Geometry Approach
to Grid Generation** Second Edition V. D. Liseikin

Stochastic Numerics for Mathematical Physics
G. N. Milstein, M. V. Tretyakov

**Conjugate Gradient Algorithms
and Finite Element Methods**

M. Křížek, P. Neittaanmäki, R. Glowinski,
S. Korotov (Eds.)

**Finite Element Methods
and Their Applications** Z. Chen

**Mathematics of Large Eddy Simulation
of Turbulent Flows**

L. C. Berselli, T. Iliescu, W. J. Layton

Large Eddy Simulation for Incompressible Flows
An Introduction Third Edition
P. Sagaut

Spectral Methods Fundamentals in Single Domains
C. Canuto, M. Y. Hussaini,
A. Quarteroni, T. A. Zang

Stochastic Optimization
J. J. Schneider, S. Kirkpatrick