

Contents

Foreword	iii
Contributors.....	v
Acknowledgments	vii
Preface: An Elementary Introduction <i>Joe F. Thompson, Bharat K. Soni, and Nigel P. Weatherill</i>	ix
1 Fundamental Concepts and Approaches <i>Joe F. Thompson and Nigel P. Weatherill</i>	1-1

PART I Block-Structured Grids

Introduction to Structured Grids <i>Joe F. Thompson</i>	I-1
2 Mathematics of Space and Surface Grid Generation <i>Zahir U.A. Warsi</i>	2-1
3 Transfinite Interpolation (TFI) Generation Systems <i>Robert E. Smith</i>	3-1
4 Elliptic Generation Systems <i>Stefan P. Spekreijse</i>	4-1
5 Hyperbolic Methods for Surface and Field Grid Generation <i>William M. Chan</i>	5-1
6 Boundary Orthogonality in Elliptic Grid Generation <i>Ahmed Khamayseh, Andrew Kuprat, and C. Wayne Mastin</i>	6-1
7 Orthogonal Generation Systems <i>Luís Eça</i>	7-1
8 Harmonic Mappings <i>Sergey A. Ivanenko</i>	8-1
9 Surface Grid Generation Systems <i>Ahmed Khamayseh and Andrew Kuprat</i>	9-1
10 A New Approach to Automated Multiblock Decomposition for Grid Generation: A Hypercube++ Approach <i>Sangkun Park and Kunwoo Lee</i>	10-1

11	Composite Overset Structured Grids	<i>Robert L. Meakin</i>	11-1
12	Parallel Multiblock Structured Grids	<i>Jochem Häuser, Peter R. Eiseman, Yang Xia, and Zheming Cheng</i>	12-1
13	Block-Structured Applications	<i>Timothy Gatzke</i>	13-1

PART II Unstructured Grids

	Introduction to Unstructured Grids	<i>Nigel P. Weatherill</i>	II-2
14	Data Structures for Unstructured Mesh Generation	<i>Luca Formaggia</i>	14-1
15	Automatic Grid Generation Using Spatially Based Trees	<i>Mark S. Shephard, Hugues L. de Cougny, Robert M. O’Bara, and Mark W. Beall</i>	15-1
16	Delaunay–Voronoi Methods	<i>Timothy J. Baker</i>	16-1
17	Advancing Front Grid Generation	<i>J. Peraire, J. Peiró, and K. Morgan</i>	17-1
18	Unstructured Grid Generation Using Automatic Point Insertion and Local Reconnection	<i>David L. Marcum</i>	18-1
19	Surface Grid Generation	<i>J. Peiró</i>	19-1
20	Nonisotropic Grids	<i>Paul Louis George and Frédéric Hecht</i>	20-1
21	Quadrilateral and Hexahedral Element Meshes	<i>Robert Schneiders</i>	21-1
22	Adaptive Cartesian Mesh Generation	<i>Michael J. Aftosmis, Marsha J. Berger, and John E. Melton</i>	22-1
23	Hybrid Grids	<i>Jonathon A. Shaw</i>	23-1
24	Parallel Unstructured Grid Generation	<i>Hugues L. de Cougny and Mark S. Shephard</i>	24-1
25	Hybrid Grids and Their Applications	<i>Yannis Kallinderis</i>	25-1
26	Unstructured Grids: Procedures and Applications	<i>Nigel P. Weatherill</i>	26-1

PART III Surface Definition

Introduction to Surface Definition	<i>Bharat K. Soni</i>	III-1
27 Spline Geometry: A Numerical Analysis View	<i>David R. Ferguson</i>	27-1
28 Computer-Aided Geometric Design	<i>Gerald Farin</i>	28-1
29 Computer-Aided Geometric Design Techniques for Surface Grid Generation	<i>Bernd Hamann, Brian Jean, and Anshuman Razdan</i>	29-1
30 NURBS in Structured Grid Generation	<i>Tzu-Yi Yu and Bharat K. Soni</i>	30-1
31 NASA IGES And NASA-IGES NURBS Only Standard	<i>Austin L. Evans and David P. Miller</i>	31-1

PART IV Adaptation and Quality

Introduction to Adaptation and Quality	<i>Bharat K. Soni</i>	IV-1
32 Truncation Error on Structured Grids	<i>C. Wayne Mastin</i>	32-1
33 Grid Optimization Methods for Quality Improvement and Adaptation	<i>Olivier-Pierre Jacquotte</i>	33-1
34 Dynamic Grid Adaptation and Grid Quality	<i>D. Scott McRae and Kelly R. Laflin</i>	34-1
35 Grid Control and Adaptation	<i>O. Hassan and E. J. Probert</i>	35-1
36 Variational Methods of Construction of Optimal Grids	<i>O. B. Khairullina, A. F. Sidorov, and O. V. Ushakova</i>	36-1
37 Moving Grid Techniques	<i>Paul A. Zegeling</i>	37-1
Appendix A: Grid Software and Configurations	<i>Bharat K. Soni</i>	A-1
Appendix B: Grid Configurations	<i>Bharat K. Soni</i>	B-1