1. Record Nr. UNINA9911020141803321

Autore	Frey Pascal Jean
Titolo	Mesh generation : application to finite elements / / Pascal Jean Frey, Paul-Louis George
Pubbl/distr/stampa	London, : ISTE Hoboken, NJ, : John Wiley & Sons, 2008
ISBN	1-282-68783-2 9786612687839 0-470-61116-2 0-470-39379-3
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (850 p.)
Collana	ISTE ; ; v.32
Altri autori (Persone)	GeorgePaul L
Disciplina	620.001/51825
Soggetti	Finite element method Numerical grid generation (Numerical analysis) Triangulation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Mesh Generation; Contents; Introduction; Symbols and Notations; 1 General Definitions; 1.1 Covering-up and triangulation; 1.2 Mesh. mesh element. finite element mesh; 1.3 Mesh data structures; 1.4 Control space and neighborhood space; 1.5 Mesh quality and mesh optimality; 2 Basic Structures and Algorithms; 2.1 Why use data structures?; 2.2 Elementary structures; 2.3 Basic notions about complexity; 2.4 Sorting and searching; 2.5 One-dimensional data structures; 2.6 Two and three-dimensional data structures; 2.7 Topological data structures; 2.8 Robustness; 2.9 Optimality of an implementation 2.10 Examples of generic algorithms3 A Comprehensive Survey of Mesh Generation Methods; 3.1 Classes of methods; 3.2 Structured mesh generators; 3.2.1 Algebraic interpolation methods; 3.2.2 PDE-based methods; 3.2.3 Multiblock method; 3.2.4 Product method (topology-based method); 3.3 Unstructured mesh generators; 3.3.1 Spatial decomposition methods; 3.3.2 Advancing-front method; 3.3.3 Delaunay technique; 3.3.4 Tentative comparison of the three classical methods; 3.3.5 Other methods; 3.4 Surface meshing; 3.4.1 Mesh

generation via a parametric space; 3.4.2 Implicit surface triangulation
3.4.3 Direct surface meshing3.4.4 Surface remeshing; 3.5 Mesh adaptation; 3.6 Parallel unstructured meshing; 4 Algebraic, PDE and Multiblock Methods; 4.1 Algebraic methods; 4.1.1 Trivial mapping functions; 4.1.2 Quadrilateral or triangular analogy; 4.1.3 Surface meshing; 4.1.4 Hexahedral, pentahedral or tetrahedral analogy; 4.1.5 Other algebraic methods and alternative methods; 4.2 PDE-based methods; 4.2.1 Basic ideas; 4.2.2 Surface meshing and complex shapes; 4.3 Multiblock method; 4.3.1 Basic ideas; 4.3.2 Partitioning the domain; 4.3.3 Computational issues and application examples
5 Quadtree-octree Based Methods5.1 Overview of spatial decomposition methods; 5.2 Classical tree-based mesh generation; 5.3 Governed tree-based method; 5.4 Other approaches; 5.5 Extensions; 6 Advancing-front Technique for Mesh Generation; 6.1 A classical advancing-front technique; 6.2 Governed advancing-front method; 6.3 Application examples; 6.4 Combined approaches; 6.5 Extensions; 7 Delaunay-based Mesh Generation Methods; 7.1 Vorono diagram and Delaunay triangulation; 7.2 Constrained triangulation; 7.2.1 Maintaining a constrained entity; 7.2.2 Enforcing a constraint
7.3 Classical Delaunay meshing7.3.1 Simplified Delaunay type triangulation method; 7.3.2 Boundary integrity and domain identification; 7.3.3 Field point creation; 7.3.4 Optimization; 7.3.5 Practical issues; 7.3.6 Application examples; 7.4 Other methods; 7.4.1 Point insertion methods; 7.4.2 Field point creation; 7.4.3 Boundary enforcement; 7.5 Isotropic governed Delaunay meshing; 7.6 Extensions; 7.6.1 Weighted Delaunay triangulation; 7.6.2 Anisotropic Delaunay meshing; 7.6.3 Surface meshing; 8 Other Types of Mesh Generation Methods; 8.1 Product method; 8.2 Grid or pattern-based methods
8.3 Optimization-based method

Sommario/riassunto

The aim of the second edition of this book is to provide a comprehensive survey of the different algorithms and data structures useful for triangulation and meshing construction. In addition, several aspects are given full coverage, such as mesh modification tools, mesh evaluation criteria, mesh optimization, adaptive mesh construction and parallel meshing techniques.This new edition has been comprehensively updated and also includes a new chapter on mobile or deformable meshes.