



# Finite Element Mesh Generation

*Daniel S.H. Lo*

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**Finite Element Mesh Generation** Daniel S.H. Lo

*Highlights the Progression of Meshing Technologies and Their Applications*

Finite Element Mesh Generation provides a concise and comprehensive guide to the application of finite element mesh generation over 2D domains, curved surfaces, and 3D space. Organised according to the geometry and dimension of the problem domains, it develops from the basic meshing algorithms to the most advanced schemes to deal with problems with specific requirements such as boundary conformity, adaptive and anisotropic elements, shape qualities, and mesh optimization.

It sets out the fundamentals of popular techniques, including:

- Delaunay triangulation
- Advancing-front (ADF) approach
- Quadtree/Octree techniques
- Refinement and optimization-based strategies

From the geometrical and the topological aspects and their associated operations and inter-relationships, each approach is vividly described and illustrated with examples. Beyond the algorithms, the book also explores the practice of using metric tensor and surface curvatures for generating anisotropic meshes on parametric space. It presents results from research including 3D anisotropic meshing, mesh generation over unbounded domains, meshing by means of intersection, re-meshing by Delaunay-ADF approach, mesh refinement and optimization, generation of hexahedral meshes, and large scale and parallel meshing, along with innovative unpublished meshing methods. The author provides illustrations of major meshing algorithms, pseudo codes, and programming codes in C++ or FORTRAN.

Geared toward research centers, universities, and engineering companies, **Finite Element Mesh Generation** describes mesh generation methods and fundamental techniques, and also serves as a valuable reference for laymen and experts alike.

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