GENERATION OF TRIANGULAR MESHES FOR COMPLEX DOMAINS ON THE PLANE

Summary

Many physical phenomena can be modeled by partial differential equations. The development of numerical methods based on the spatial subdivision of a domain into finite elements immediately gave rise to the task of generating a mesh. With the availability of versatile field solvers and powerful computers, the simulations of ever increasing geometrical and physical complexity are attempted. At some point the main bottleneck become the mesh generation itself.

The paper presents a detailed description of the triangular mesh generation scheme on the plane based upon the Delaunay triangulation. A mesh generator should be fully automatic and simplify input data as much as possible. It should offer rapid gradation from small to large sizes of elements. The generated mesh must be always valid and of good quality. All these requirements were taken into account during the selection and elaboration of utilized algorithms.

Successive chapters describe procedures connected with the specification of a modeled domain, generation and triangulation of boundary vertices, introducing inner nodes, improving the quality of the created mesh, and renumbering of vertices.