

An Automatic Topology Recovery Method Based on T-Spline

Surfaces Reconstruction in BFM

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Abstract

Consistent topology is an important precondition of successful mesh generation and CAE analysis. However, topology recovery is one of the most complex issues of mesh generation. Generally, geometry noises, such as micro-surfaces and micro-curves, are introduced by the Boolean operations or system tolerance etc. in CAD modeling process. These geometry noises usually lead to a mesh with poor quality or even fail to generate mesh. In this paper, an automatic topology recovery method based on T-spline surface reconstruction is presented to deal with these geometry noises. Our method is divided into the following several steps. In the first step, those faces, which satisfies C0 continuous requirement with adjacent faces in its boundary, are detected automatically. Then, unordered points are sampled from these faces. In the third step, T-spline surface will be reconstructed with these points. Finally, consistent topology is obtained without changing CAD entities by using relationship between T-spline surface and original topology objects. Several examples of automatic topology recovery and corresponding meshing on complex structures are presented to validate the proposed method.

Keywords: BFM, Topology recovery, T-spline surface reconstruction, Mesh generation, Geometry noise.