

A new automatic quadrangle mesh generation method for Boundary Face Method

***Pan Wang¹, †Jianming Zhang¹, Lei Han¹ and Chenjun Lu¹**

¹State Key Laboratory of Advanced Design and Manufacturing for Vehicle Body, Hunan University,
Changsha 410082, China

†Corresponding author: zhangjm@hnu.edu.cn

*Presenting author: 329429479@qq.com

Abstract

A new quadrangle mesh generation method is proposed in this paper. First, the target face is divided into several sub-faces. Then, an appropriate method is selected to generate quadrangle mesh in each sub-face. Finally, the mesh data of target face is obtained by merging the data of sub-faces. For the simple sub-face, mapping is selected to generate quadrangle mesh, while for the face with hole or keyway, a method based on divide block which combining mapping with Q-Morph is used to generate quadrangle mesh. The divide block method consists of the following main steps: The first step, the location of small feature such as hole and keyway is determined. The second step, the quadrangle meshes which are covered by small feature are eliminated from background grid, and unstructured quadrangle mesh is generated in this region by the method of Q-Morph. The third step, the mesh of target face is obtained by combining the background grid and the unstructured quadrangle mesh. The new method makes full use of mapping's advantages of high efficiency and high-quality mesh and Q-Morph's advantages of powerful geometric adaptive capacity. The generated mesh contains the majority of structured mesh and the minority of unstructured mesh. Moreover, the meshes at boundaries are high-quality structured mesh.

Key words: BFM, quadrangle mesh, background grid, mesh generation