FLOW AROUND A BEE, UNSTRUCTURED GRID GENERATION

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Abstract

This paper discusses the unstructured grid method to compute flows around geometrically complex bodies having relative motions. To enhance the capability to treat complex geometries, a surface triangulation method using the advancing front method coupled with geometric feature extraction technique is described. Stereolithography (STL) data are adopted as an interface between a CAD system and the surface grid generator. Moving bodies are treated by the overset unstructured grid method. The capability of the method is demonstrated for simulations of a hornet in flight. In this simulation, the detailed components such as antennas, legs and a sting are all included in the computational grid. The flapping wings are treated by the overset unstructured grid method where a grid around the wing is overlapped on a stationary grid around the body of a hornet and moves with time to simulate the flapping motion.

Keyword: unstructured mesh CFD, mesh generation, insect flight

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