

Development and Implementation of Potential-based Immersed Boundary Method

The Immersed Boundary Method (IBM) allows Cartesian grids to be applied to predict flows around bodies with complex boundaries. This idea is very attractive because it allows the generation of complex curvilinear grids to be avoided. To retain the accuracy of prediction, source terms equivalent to the boundary conditions on the body are to be implemented. The approach should be combined with the method of Difference Potentials (DPM) [1] to increase the efficiency. The DPM allows a boundary value problem to be reduced to a boundary problem in a quite general formulation without the knowledge of Green's function. The combined method will be as fast as the explicit IBM, whilst CFL condition is unlimited as in the implicit IBM.

1. Ryaben'kii, V.S., "Method of Difference Potentials and Its Applications", Springer-Verlag, 2002.