

An Immersed Boundary Method with Implicit Direct Forcing for Incompressible Flows

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ABSTRACT

The immersed boundary (IB) methods are very useful to simulate flow around a complex geometry in Cartesian grid. Among various IB methods, a direct forcing has been widely used because of its simplicity. However, it is known that no-slip boundary conditions at the IB surface is less accurately imposed due to explicit treatment of the forcing, especially for low Reynolds number flows. This talk will focus on recent development of IB method with implicit direct forcing to pursue more accurate treatment of the boundary forcing. The proposed IB method is derived using a block LU decomposition and Taylor series expansion. The direct forcing for imposing no-slip condition on the IB surface is calculated in an iterative procedure. Simulation results for flows around rigid objects as well as fluid-structure interaction will be presented at the meeting.

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