An Implicit Immersed Boundary Method for Low Reynolds Number Incompressible Flows[1] HYUN WOOK PARK, CHANGHOON LEE, JUNG-IL CHOI, Dept. of CSE, Yonsei Univesity — We develop a new formulation of immersed boundary (IB) method based on direct forcing for incompressible viscous flows. The new algorithm for the present IB method is derived using a block LU decomposition and Taylor series expansion, and the direct forcing for imposing no-slip condition on the IB surface is calculated in an iterative procedure. We perform simulations of two-dimensional flows around a circular cylinder and three-dimensional flows over a sphere for low and moderate Reynolds numbers. The result shows that present method yield a better imposition of no-slip condition on IB surface for low Reynolds number with a fairly larger time step than other IB methods based on direct forcing.

Jung-il Choi
Dept. of CSE, Yonsei Univesity

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