

Abstract Submitted
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A discrete-forcing immersed boundary method for the fluid-structure interaction of an elastic slender body¹ INJAE LEE, HAECHEON CHOI, Seoul National University — In the present study, an immersed boundary method for the simulation of flow around an elastic slender body is developed. The present method is based on the discrete forcing method by Kim et al. (J. Comput. Phys., 2001) and is fully coupled with the elastic slender body motion. The incompressible Navier-Stokes equations are solved in an Eulerian coordinate and the elastic slender body motion is described in a Lagrangian coordinate, respectively. The elastic slender body is assumed as a thin flexible beam and is segmented by finite blocks. Each block is then moved by the external and internal forces such as the hydrodynamic, tension, bending, and buoyancy forces. We simulate several flow problems and the results agree very well with those from previous studies. Moreover, the present method does not impose any severe limitation on the size of computational time step due to the numerical stability.

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