Research

Colloquium

On direct-forcing immersed boundary projection methods for FSI problems

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摘　要：

In this talk, I will introduce some direct-forcing immersed boundary projection methods for simulating the dynamics of fluid-solid interaction problems, where the immersed solid object can be moving with or without a prescribed velocity. I will focus on the two-way coupling problems. The direct forcing approach is mainly based on the projection schemes for the incompressible Navier-Stokes equations on the whole domain with a virtual force added to the momentum equations. This virtual force is distributed not only on the immersed boundary but also on the whole region enclosed by the immersed boundary such that the fluid part inside the region would behave like a real solid body. Thus the problem can be solved on the entire domain with a Cartesian grid. Of course, how to find the virtual force is the most crucial issue of the approach. In this talk, I will discuss some practical issues for developing an efficient direct-forcing immersed boundary projection method. Some numerical experiments will be presented.