Department of Mathematics

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Scientific Computing Seminar

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The Immersed Interface Method and Applications to CFD Problems

Thursday, April 5, 2012
3:00 PM- 4:00 PM
Room 646 PGH

Abstract: The Immersed Interface Method (IIM, LeVeque/Li) was motivated by Peskin's Immersed Boundary (IB) Method. The IIM shares many characteristics of the IB method. Both methods use simple grid structure. The original motivation of the IIM is to improve the accuracy of the IB method from first order to second order. This has been achieved by incorporating the jump conditions into numerical schemes near or on the interface. The IIM has been coupled with evolution schemes such as the front tracking method, the level set method for moving interface/free boundary problems. In this talk, I will summarize some recent advances of the IIM, particularly, the applications to incompressible Stokes and Navier-Stokes equations with singular sources, discontinuous viscosity, irregular domains, and free boundary and moving interfaces using the augmented IIM. Applications include flow past cylinders, moving contact line problems, deformable moving interfaces, and incompressible interfaces in incompressible flows.