Department of Mathematics

University of Houston

## Scientific Computing Seminar

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## A numerical approach to viscoplastic free surface flows using dynamic meshes

Friday, March 30, 2012 3:00 PM- 4:00 PM Room 646 PGH

## Abstract:

We develop an approach for numerical simulation of free surface flows of Newtonian and viscoplastic incompressible fluids. The approach is based on the level set method for capturing free surface evolution and features compact finite difference approximations of fluid and level set equations on locally refined and dynamically adapted octree Cartesian grids. Popular in computer graphics and fluid animation dynamic octree meshes turn out to be quite challenging if solutions to governing fluid equations should be of scholar accuracy. Thus several important choices have to be made and tools to be developed for the entire simulations to be predictive and to remain efficient. A disretization, the handling of constitutive relations, a surface reconstruction, a surface tension forces evaluation: these and other building blocks of the numerical method will be discussed in the talk. Numerical examples will demonstrate the performance of the approach for several benchmark and complex 3D Newtonian and viscoplastic fluid with free surfaces.

This is a part of the joint research with Kirill Nikitin, Kirill Terehov, and Yuri Vassilevski from the Inst. Numer. Math. RAS in Moscow.

This seminar is easily accessible to persons with disabilities. For more information or for assistance, please contact the Mathematics Department at 743-3500.