Department of Mathematical Sciences
The University of Texas at El Paso

Colloquium

Young Ju Lee

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San Marcos

Friday, September 26, 2014 at 3pm in Bell Hall 143

Stable Hybrid Discretizations and Fast Solvers for Non-Newtonian Fluids Flows and Applications

Abstract : We present a hybrid solver for general rate-type non-Newtonian fluids models. This method is fully implicit and each nonlinear iteration consists of three steps: (1) locating the characteristic feet of fluid particles, (2) solving the momentum equation and continuity equation, and (3) solving the constitutive equations. For stability and accuracy purposes, we employ a higher order conforming approximation of the Stokes equation on the target mesh and a lower order stress field approximation on a finer mesh. For the solution to the conforming finite element methods for the Stokes equation, we apply an auxiliary space preconditioning method, in which low-order finite element spaces are employed as auxiliary spaces. The stress equation is formulated on the refined grids to reduce the accuracy gap between velocity and stress. Numerical results demonstrate the advantages of the proposed algorithm in terms of efficiency, robustness, and weak scalability.

For further information, please contact Dr. Emil Schwab, eschwab@utep.edu
Refreshments will be served in front of the colloquium room,
15 minutes before the start of the colloquium.