

Department of Mathematical Sciences Colloquium

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Advanced Computational Techniques for Incompressible/Compressible Fluid-Structure Interactions

In this talk, I will present results from a numerical modeling of a highly nonlinear Fluid-Structure Interaction (FSI) coupled problem using a stabilized space-time finite element technique on the 3D, time-dependent nonlinear advective-diffusive partial differential equations. Some of the numerical difficulties such as the coupling, mesh motion and update, contact of two surfaces are addressed. Implementation of a porosity model based on Darcys law is analyzed to study its impact on the fluid dynamic forces of deformable objects. Finally, the existing capabilities of the FSI solver is presented for a compressible flows involving deformable structures on massively parallel computers using MPI libraries to study shock-fluid-structure interaction.

Fluid-Structure Interaction (FSI) problems are of great importance to many fields of engineering and pose tremendous challenges to numerical analyst. This talk addresses some of the hurdles faced for both 2D and 3D real life time-dependent FSI problems with particular emphasis on parachute systems. The techniques developed here would help improve the design of parachutes and are of direct relevance to several other FSI problems.

**Friday, April 11, 2008 at 2 pm in Bell Hall 143
The University of Texas at El Paso**

Please note the unusual time for the Colloquium.
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Refreshments will be served in front of the colloquium room, 15 minutes before the start of the colloquium.

For further information, please contact Dr. Pavel Solin, Bell Hall 220. Phone: (915) 747-6770, email: solin@utep.edu.