Department of Mathematical Sciences Colloquium

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X-FEM for Fluid Structure Interaction

The extended finite element method (X-FEM) has developed as a very general and effective method for dealing with strong and weak discontinouities such as material fracture, inhomogenieties and boundary layers. This talk will discuss the application of these methods to fluid structure interaction (FSI) problems. The method uses an Lagrangian representation of the solid superimposed on a fixed Eulerian grid for the fluid discretization. The fluid and structure are coupled through interfacial enforcements of traction and continuity. X-FEM can handle several problems not presently tractable with typical methods such as arbitrary Eulerian Lagrangian (ALE) and hydrocodes such as interaction with continuum elements, large deformation and solid liquid gas problems.

The talk will give a brief overview of several methods for FSI, such as arbitrary Eulerian Lagrangian (ALE), immersed boundary method (IBM), fictitious domain method (FDM) and immersed finite element method (I-FEM). as well as X-FEM. In addition the following topics will be discussed: velocity and pressure enrichment schemes, solid fluid coupling, implementation in standard finite element codes. Several examples of X-FEM for FSI will be presented including large scale coupling to both continuum and structural elements as well as rigid structures.

Friday, September 23, 2005 at 3 pm. in Bell Hall 143 The University of Texas at El Paso

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 Šolín, Bell Hall 220. Phone: (915) 747-6770, email: solin@utep.edu.