

Analysis and Applied Mathematics Seminar

The reference map technique for simulating complex materials and multi-body interactions

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Abstract: Conventional computational methods often create a dilemma for fluid–structure interaction problems. Typically, solids are simulated using a Lagrangian approach with grid that moves with the material, whereas fluids are simulated using an Eulerian approach with a fixed spatial grid, requiring some type of interfacial coupling between the two different perspectives. Here, a fully Eulerian method for simulating structures immersed in a fluid will be presented. By introducing a reference map variable to model finite-deformation constitutive relations in the structures on the same grid as the fluid, the interfacial coupling problem is highly simplified. The method is particularly well suited for simulating soft, highly-deformable materials and many-body contact problems, and several examples in two and three dimensions will be presented.

Monday, November 8 at 4:00 PM in 636 SEO