1036-65-68 Xiangmin Jiao*, jiao@ams.sunysb.edu. Interface Tracking Using Face Offsetting and Anisotropic Mesh Adaptation.

Dynamic moving interfaces are central to many scientific and engineering applications. In this talk, we present a novel method for moving surface meshes, called the face offsetting method, based on a generalized Huygens' principle. Our method operates directly on a Lagrangian surface mesh, without requiring an Eulerian volume mesh. Unlike traditional Lagrangian methods, which move each vertex directly along an approximate normal or user-specified direction, our method propagates faces and then reconstructs vertices through an eigenvalue analysis locally at each vertex to resolve normal and tangential motion of the interface simultaneously. The method also includes techniques for ensuring the integrity of the surface as it evolves. Face offsetting provides a unified framework for various dynamic interface problems and delivers accurate physical solutions even in the presence of singularities and large curvatures. We present the theoretical foundation of our method, and also show its use in the simulations of the burning of solid-propellant rockets. (Received January 10, 2008)