

COLLOQUIUM
UNIVERSITY OF PITTSBURGH
FRIDAY, SEPTEMBER 26, 2008
704 THACKERAY HALL
4:00 P.M.

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MATHEMATICAL MODELING & ANALYSIS
LOS ALAMOS NATIONAL LABORATORY

MOMENT-OF-FLUID INTERFACE RECONSTRUCTION

ABSTRACT: The purpose of the Moment-of-Fluid (MoF) technique is reconstruction of the mixed-cell material interfaces from the moment data: the volumes and centroids of materials. The governing principle of the MoF interface reconstruction is the minimization of the first moment defect, subject to preservation of all material volumes. In the case of two materials this principle allows to find the direction of the interface normal, and in the case of multiple materials this principle helps to determine the order, in which the materials should be separated. Compared to the competitors, the Volume-of-Fluid (VoF) interface reconstruction techniques, MoF algorithm shows higher accuracy, allows uniform processing of internal and boundary cells, and is truly robust in treating multi-material mixed-cells. We present some 2D and 3D results.

We will also present a novel adaptive mesh refinement (AMR) strategy based on moment-of-fluid (MOF) method for volume-tracking evolving interface computation is presented. The mesh refinement criterion is based on the deviation of the actual centroid obtained by interface reconstruction from the reference centroid given by moment advection process. The centroid error indicator detects not only high curvature regions but also regions with complicated subcell structures like filaments. A new Lagrange+remap moment advection scheme, which includes Lagrangian backtracking, polygon intersection based remapping and forward tracking to define material centroid is presented.

Refreshments served at 3:30 p.m.
in the Math Dept. COMMON ROOM, Thackeray 705