

Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Stabilized Conservative Level Set Method with Adaptive Wavelet-based Mesh Refinement NAVID SHERVANI-TABAR, OLEG V. VASILYEV, Univ of Colorado - Boulder — This paper addresses one of the main challenges of the conservative level set method, namely the ill-conditioned behavior of the normal vector away from the interface. An alternative formulation for reconstruction of the interface is proposed. Unlike the commonly used methods which rely on the unit normal vector, Stabilized Conservative Level Set (SCLS) uses a modified renormalization vector with diminishing magnitude away from the interface. With the new formulation, in the vicinity of the interface the reinitialization procedure utilizes compressive flux and diffusive terms only in the normal direction to the interface, thus, preserving the conservative level set properties, while away from the interfaces the directional diffusion mechanism automatically switches to homogeneous diffusion. The proposed formulation is robust and general. It is especially well suited for use with adaptive mesh refinement (AMR) approaches due to need for a finer resolution in the vicinity of the interface in comparison with the rest of the domain. All of the results were obtained using the Adaptive Wavelet Collocation Method, a general AMR-type method, which utilizes wavelet decomposition to adapt on steep gradients in the solution while retaining a predetermined order of accuracy.

Navid Shervani-Tabar
Univ of Colorado - Boulder

Date submitted: 14 Jul 2016

Electronic form version 1.4