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Gradient Augmented Level Set Reinitialization Approach LAKSHMAN ANUMOLU, MARIO TRUJILLO, University of Wisconsin-Madison — A new reinitialization technique in the framework of augmented level set methods is proposed. The reinitialization PDE introduced by Sussman et al. to reconstruct signed distance function is reformulated into gradient augmented framework and solved using semi-Lagrangian approach. In order to address the issue of interfacial drift we introduce a hybrid strategy, in which this erroneous drift is handled well by anchoring the interface. In this approach, two regions, interfacial and non-interfacial regions are identified in the computational domain, where the level set and its gradient values are updated explicitly by locating the interface for the nodes belonging to the interfacial region. Two approaches are followed to identify the interface, of which, one uses the underlying Hermite polynomial evaluated along the characteristic curve, and the other uses the variant of Newton's method proposed by Chopp. Results show 4^{th} and 3^{rd} order spatial convergence rate for the level set function and its gradient respectively. Effect of temporal schemes is also studied with two temporal schemes, first order Euler and third order RK schemes. Unlike the numerical oscillations noted by Min in their work with Euler scheme, we have not noticed them in the presented hybrid scheme.

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