

# **A Particle Corrected Level Set Method for Interface Reconstruction**

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In this paper, a numerical method based on the level set approach and a particle method has been developed to simulate two dimensional laminar incompressible immiscible two phase flows, aiming to reduce the undue smoothness caused by the traditional level set method. Passively advected Lagrangian marker particles at the interface are seeded and tracked to correct the near-interface nodal values of the level set function computed from the Eulerian evolution equation. This kind of interface reconstruction is designed to occur in under-resolved regions such as flows experiencing stretching and/or tearing. That way, the interface geometry of large curvature can be sustained with almost complete fidelity. An improved area conservation property reflects the global effect of the present approach. In contrast to the work of Enright et al. [1], the marker particles are distributed only at the interface (curves in the two dimensional problem), increasing minor computational cost. In the test examples with the velocity field being coupled with the interface motion, the present method excels the traditional one in preserving the area and capturing fine interface geometry while maintaining sufficient smoothness.

## **References**

- [1] D. Enright, R. Fedkiw, J. Ferziger, and I. Mitchell, "A hybrid particle level set method for improved interface capturing," accepted by the *Journal of Computational Physics* (July 16, 2002).