

Accepted Manuscript

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PII: S0021-9991(15)00138-2
DOI: <http://dx.doi.org/10.1016/j.jcp.2015.03.005>
Reference: YJCPH 5758

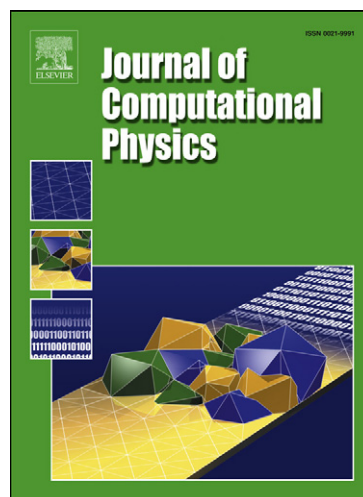
To appear in: *Journal of Computational Physics*

Received date: 5 December 2014

Accepted date: 5 March 2015

Please cite this article in press as: Y. Wang et al., A mass-conserved diffuse interface method and its application for incompressible multiphase flows with large density ratio, *J. Comput. Phys.* (2015), <http://dx.doi.org/10.1016/j.jcp.2015.03.005>

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A Mass-Conserved Diffuse Interface Method and Its Application for Incompressible Multiphase Flows with Large Density Ratio

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Abstract

A mass-conserved diffuse interface method is proposed in this work for simulating incompressible flows of binary fluids with large density ratio. In the method, a mass correction term is introduced into the Cahn-Hilliard equation to compensate the mass losses or offset the mass increases caused by the numerical and modeling diffusion. Since the mass losses or increases are through the phase interfaces and at each time step, their values are very small, to keep mass conservation, mass sources or sinks are introduced and uniformly distributed in the volume of diffuse layer. With the uniform distribution, the mass correction term representing mass sources or sinks is derived analytically by applying mass conservation principle. By including the mass

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