Abstract Submitted
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Applying the Height Function Method to Conservative Dual Grids[1] KRISTOPHER OLSHEFSKI, MARK OWKES, Montana State University — The atomization process is significantly affected by the surface tension force, which controls the size and distribution of droplets. The surface tension force is directly proportional to the interface curvature and an accurate calculation of curvature is essential for predictive simulations of atomization.The height function method is a common technique to compute an accurate curvature as it is straightforward to implement and provides a second-order calculation. Additionally, using a Rudman dual mesh (Int. J. Numer. Meth. Fluids, 1998), which discretizes density on a twice as fine mesh, provides consistent and conservative discretizations of mass and momentum. This work extends the standard height function method to include information from the Rudman dual mesh. When a dual grid is used, the standard height function method fails to capture fine grid interface perturbations and these perturbations can grow. The proposed method leverages a fine-grid height function method to compute the fine-gird interface perturbations and uses a fine-grid velocity field to oppose the fine-grid perturbations. This approach maintains consistent mass and momentum transport while also providing accurate interface transport that avoids non-physical dynamics.

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Kristopher Olshefski
Montana State University

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