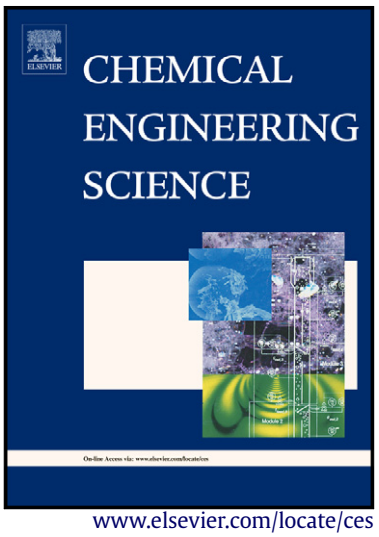

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A Two-Fluid Model with a Tensor Closure Model Approach for Free Surface Flow Simulations.

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Abstract: In multiphase flows, the mathematical and physical nature of the phenomena leads to the postulation of closure models to describe the exchange of momentum across the interface as well as other properties such as heat and mass, and there are various models available with this intent. However, unlike dispersed flows, free surface flows have a lack of correlations for the drag coefficient, which is an issue to manage in this kind of flows. In this paper, the calculation of the interfacial density force was done dynamically without the use of any correlation through the modeling the viscous tensor and the normal vector to the interface. The model has been applied to test cases as vertical shear flow, dam break and Rayleigh-Taylor instability. The comparison of the results was satisfactory with good agreement with numerical and experimental data from the literature, as well as with the standard approach also employed. These results indicate that the model is a good alternative for stratified flows, and also can be used directly to calculate the drag coefficient when the standard formulation is preferred.

Key-words: free surface flow, closure model, two-phase flow, CFD.