

# MODELING AND SIMULATION FOR MULTI-COMPONENT FLUIDS

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## ABSTRACT

We consider four-component immiscible fluid flows. To model multi-component fluid flows, we introduce phase-fields to represent different fluid components. At each point in the transition region of the interfaces between different fluids, we define a force density which is proportional to the curvature of the interface times a smoothed Dirac delta function. The final model consists of a modified Navier-Stokes equations and vector-valued Cahn-Hilliard equations. We give computational experiments to illustrate the properties of the method. The experiments are phase separations via a spinodal decomposition in a four-component mixture, pressure field distribution for three stationary drops, and the dynamics of two droplets inside another drop embedded in the ambient liquid.

## REFERENCES

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