

Diffuse Interface Models for Viscous Two-Phase Flows

Abstract: In this presentation we discuss a Navier-Stokes/Cahn-Hilliard system, which arises as a "diffuse interface model" for the flow of two viscous incompressible Newtonian fluids in a bounded domain. The fluids are assumed to be macroscopically immiscible, but a partial mixing in a small interfacial region is assumed in the model. In the case of same densities we prove the existence of weak solutions in two and three space dimensions for a class of physical relevant and singular free energy densities. Moreover, we present some results on regularity and uniqueness of weak solutions and show that any weak solution converges as $t \rightarrow \infty$ to a solution of the stationary system. Finally, we discuss the case of different densities.