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Well-posedness for a non-isothermal flow of two viscous incompressible fluids

This work is concerned with a non-isothermal diffuse-interface model which describes the motion of a mixture of two viscous incompressible fluids. The fluids are assumed to have matched densities and the same viscosity and thermal conductivity. The model consists of modified Navier-Stokes equations coupled with a phase-field equation given by a convective Allen-Cahn equation, and energy transport equation for the temperature. We prove the existence of a global weak solution in two and three dimensions, the existence and uniqueness of the global strong solution in the two-dimensional case, and the local strong solution in the three-dimensional case, without any restriction on the size of the initial data. Joint work with J. Honda Lopes (Unicamp)