Stefano Bosia

On the longtime behavior of a 2D hydrodynamic model for chemically reacting binary fluid mixtures

We consider a 2D diffuse interface model for a chemically reacting incompressible binary fluid (e.g. bistable polymers) in a bounded domain. The corresponding evolution system consists of the Navier-Stokes equations for the (averaged) fluid velocity, which are nonlinearly coupled with a convective Cahn-Hilliard-Oono type equation for the difference of the two fluid concentrations. The effects of a (reversible) chemical transition between the two phases of the fluid is represented in the latter equation by a reaction term driving the overall average composition of the fluid towards a fixed equilibrium concentration dictated by the chemical dynamics. We show that the global dynamic behavior of the system is robust with respect to the chemical reaction term. More precisely, we construct a family of exponential attractors, which is continuous with respect to the reaction rate also in the limit of vanishing reacting term. If time permits, some related open issues will also be addressed.