Hyperbolic limit and Asymptotic Behavior of the Keller-Segel Model with Density Control

Yasmin Dolak-Struss[1] <yasmin.dolak@oeaw.ac.at>

The Keller-Segel model is the classical model for chemotaxis of cell populations, consisting of a drift-diffusion equation for the cell density coupled with an equation describing the evolution of the chemoattractant. In this talk, we will study a special case of this model, where a nonlinear advection term turns off the chemotactic response at high cell densities. If the diffusivity of the cells is small enough, plateau-like solutions are formed. We investigate these solutions in one and two space dimensions both analytically and numerically, and explore their asymptotic behavior in bounded and in infinite domains.

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[1]RICAM, Linz