

Quantitative hypocoercivity estimates based on Harris-type theorems for kinetic models in mathematical biology

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Kinetic equations arising in biology and social sciences often have non-explicit steady states unlike the ones coming from mathematical physics such as Boltzmann-type equations. This makes it hard to use classical hypocoercivity techniques to study the long-time behaviour of these equations. Particularly it is difficult to obtain Poincaré-type inequalities. Harris-type theorems present an alternative approach since they are based on controlling the behaviour of moments rather than Poincaré-type inequalities, thus we look at the pointwise bounds rather than integral controls of operators. I will talk about two applications of Harris-type theorems: the run and tumble equation for bacterial chemotaxis and the FitzHugh Nagumo equation for interacting neuron dynamics.