

Evolution in population dynamics via nonlocal reaction diffusion models

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We are interested in biological invasions involving darwinian evolution.

First we consider a population structured by a space variable and a phenotypic trait, submitted to dispersion, mutations, growth and nonlocal competition. We discuss extinction or survival. In the latter case, we construct propagating fronts by using the Leray-Schauder topological degree.

(Joint work with J. Coville and G. Raoul.)

Next, we consider the replicator-mutator equation, a model for beneficial mutations in evolutionary genetics. By a tricky change of unknown function, we can actually compute solutions explicitly. Then, depending on the initial data, we prove different scenarii, such as acceleration for global solutions, extinction in finite time, immediate extinction. This sheds light on the biological relevance of such models.

(Joint work with R. Carles.)