

On the Fisher infinitesimal model without variability

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We study the long-time behavior of solutions to a model of sexual populations structured in phenotypes. The model features a nonlinear integral reproduction operator derived from the Fisher infinitesimal operator and a linear trait-dependent selection term. The reproduction operator describes here the inheritance of the mean parental traits to the offspring without variability. First, we show that, under assumptions on the growth of the selection rate, Dirac masses are stable around phenotypes for which the difference between the selection rate and its minimum value is less than $1/2$. Then, we prove the convergence in some Fourier-based distance of the centered and rescaled solution to a stationary profile under some conditions on the initial moments of the solution. The use of the Fourier-distance for probability measures has been inspired from the work of Lorenzo Pareschi and Giuseppe Toscani in 2006 for kinetic models of Boltzmann-Maxwell type. This work has been done in collaboration with Amic Frouvelle (Université Paris Dauphine).