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Random modeling of adaptive dynamics for sexual populations

We study models describing the evolution of a sexual (diploid) population with mutation and selection in the specific scales of the biological framework of adaptive dynamics. We take into account the genetics of the reproduction. Each individual is characterized by two allelic traits at a specific locus and by the associated phenotype. The population size is assumed to be large and the mutation rate small. We prove that under a good combination of the scales, the population process is approximated in a long time scale by a jump process describing the successive homozygote equilibria of the population. If the mutation steps are small the process is thus approximated by a deterministic differential equation generalizing the well known canonical equation of the adaptive dynamics derived for asexual populations in previous works. This work is a joint work with Pierre Collet (Ecole Polytechnique) and Hans Metz (Leiden).