

Stochastic and deterministic dynamics for adaptation and evolution of microorganisms

Sylvie MÉLÉARD

<http://www.cmap.polytechnique.fr/spip.php?rubrique61>

In a large range of species, horizontal transfer of information, such as genetic mobile elements, plasmids, endosymbionts or cultural traits, affects the adaptation of populations and the evolution of species. Understanding how they are affected is a huge challenge, in particular for microorganisms since it plays a main role in the virulence evolution or in bacterial antibiotics resistances. We propose a general eco-evolutionary stochastic model of population dynamics with clonal reproduction and mutations, including competition for resources and exchange of genes, as in the conjugation for plasmids in bacteria cells. We study different asymptotics of this general birth and death process depending on the respective demographic, ecological and transfer time scales and on the population size. We show how the gene transfer can drastically affect the evolutionary outcomes.