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# Spatial trait substitution sequence model

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## Résumé

The spatial aspect is an important issue in ecology. We use a stochastic model that takes into account the spatial motions of individuals and we study it in the context of adaptive dynamics. The theory of adaptive dynamics is used to understand the long term consequences of mutations under two main assumptions: large population and rare mutations. Firstly, in a large population limit, our stochastic model converges to a deterministic model which is a system of non-linear non-local partial differential equations. This system models the dynamics of a population of two traits. We study it to deduce the conditions that characterize the extinction and the coexistence of the two traits in a long time. We also deduce a formula of the invasion fitness of a mutant individual. Secondly, using the deterministic studies and considering large population and rare mutations asymptotics, we show the convergence of the stochastic model to a jump process that jumps in a space of monomorphic stable spatial distributions.

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