Nonparametric estimator of the distribution of fitness effects of new mutations

Guillaume Garnier*[1,2]

[1]Inria de Paris – Institut National de Recherche en Informatique et en Automatique – France
[2]Laboratoire Jacques-Louis Lions – Sorbonne Universite, Centre National de la Recherche Scientifique, Université Paris Cité – France

Résumé

Mutations are an essential mechanism that plays a key role in the history of life; in particular, they explain the appearance of new hereditary traits within a population.
These new traits can modify the selective or fitness value of an individual. In evolutionary biology, biologists are interested in distribution of fitness effects (DFE) of new mutations since it is a key element to understanding the evolutionary trajectory of a population.
In this talk, we present a probabilistic model based on compound Poisson processes that describes the evolution of the fitness of a cell line over the time . We propose an nonparametric estimator of the DFE based on the noisy observation of a i.i.d. sample of cell line over discrete time. In particular, it is not possible to observe jumps on the fitness related to the occurrence of a new mutation.
We use a Fourier approach to construct this estimator, to provide risk bounds and an adaptive procedure.

Mots-Clés: nonparametric estimator, mutation, compound poisson processes, distribution of fitness effects, Fourier estimators

*Intervenant