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Measure-valued population processes and their asymptotics

Abstract

We propose a realistic framework to model the evolution of populations; one for which each individual reproduces and dies depending on the state (such as age and type) of the individual as well as that of the entire population. Formulating the population process as a measure-valued stochastic process allows us to incorporate such dependence. We then consider a family of such population processes indexed by some parameter K, which could for example represent the carrying capacity, and give its asymptotic behaviour as K increases. Namely, we establish the law of large numbers and the central limit theorem for this setup.

Joint work with Jie Yen Fan, Peter Jagers and Fima Klebaner.