

Dynamics of an infinite age-structured particle system

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Abstract

The Markov evolution is studied of an infinite age-structured population of migrants arriving in and departing from a continuous habitat $X \subseteq \mathbb{R}^d$ – at random and independently of each other. Each population member is characterized by its age $a \geq 0$ (time of presence in the population) and location $x \in X$. The population states are probability measures on the space of the corresponding marked configurations. The result of the paper is constructing the evolution $\mu_0 \rightarrow \mu_t$ of such states by solving a standard Fokker-Planck equation for this models. We also found a stationary state μ existing if the emigration rate is separated away from zero. It is then shown that μ_t weakly converges to μ as $t \rightarrow +\infty$.

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