Tuesday, September 3rd, 16:00-17:00

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Functional Fokker-Planck equations in mutator-replicator dynamics from spatially extended stochastic systems in trait space

After some motivational examples from epidemiology and ecology and an introduction to stochastic processes of interacting populations, we examine mutator-replicator dynamics in discrete and continuous trait space and derive dynamics for expectation values and for probabilities.

In continuous trait space we obtain in this way functional Fokker-Planck equations for the evolution of probabilities. Namely, birth and death processes with competition for global resources give Kimura-like systems with mainly competitive exclusion, and systems with competition for local resources gives co-existence and speciation into different traits via Kolmogorov-Fisher-like equations.

Finally, some implications for complex behaviour in epidemiological multi-trait (multi-strain) systems are given and if time permits, super-diffusion will be discussed.