



Population growth and extinction on a changing landscape

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We explore the combined roles of varying fitness (environment) and migration on simple models of distributed populations. Within a mean-field approach, we find that variations in fitness lead to broad (power-law) distributions in local population size, somewhat smoothed by migration. This leads to novel critical behavior for a population going extinct, as well as “Richards-like growth” for an expanding population. Initially proposed as an empirical rule over half a century ago, the Richards equation has been frequently invoked in population modeling and pandemic forecasting. Central to this model is the introduction of a fractional exponent, typically fitted to the data. While various motivations for this non-analytical form have been proposed, it is still considered foremost an empirical fitting procedure. Our justification of the Richards growth law thus provides a testable connection to the distribution of constituents of the distributed population. If time permits, I shall discuss growth and extinction of competing bacteria at the front of an expanding colony.

Wednesday, Nov. 23rd, 2022 at 2:15 pm

MPI-DS, Riemannraum 1.40
Am Fassberg 17, Göttingen, and
Zoom Meeting ID: 959 2774 3389
Passcode: 651129, [direct link](#)



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