Abstract Submitted
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Extinction Time Distribution in Stochastic Lotka-Volterra System[1] MATTHEW PARKER, ALEX KAMENEV, University of Minnesota — The Lotka-Volterra model is one of the most basic problems in population dynamics. The mean-field solution to this problem predicts oscillatory evolution of two competing populations. However, an account of the discrete nature of agents inevitably results in the extinction of one or both species. We studied the distribution function of times required for such an extinction event to take place. We employed a combination of Monte-Carlo simulations and analytic techniques. As a result we achieved a complete understanding of the distribution function in the limiting cases of long and short extinction times. The long time tail is perfectly described by the lowest eigenvalue of the corresponding Fokker-Planck operator. Moreover, due to time scale separation, one may reduce the initial 2D operator to an effective 1D radial one. Remarkably, in the short time limit the Fokker-Planck approach fails, and one has to resort to the WKB treatment of the full evolution operator of the corresponding discrete stochastic problem.

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