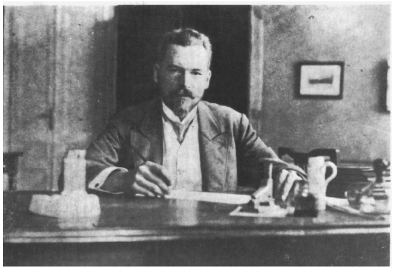

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# Extremal statistics for stochastic resetting systems

*Monday, 27 September 2021 10:00 (20 minutes)*

While averages and typical fluctuations often play a major role in understanding the behavior of a nonequilibrium system, this nonetheless is not always true. Rare events and large fluctuations are also pivotal when a thorough analysis of the system is being done. In this context, the statistics of extreme fluctuations in contrast to the average plays an important role, as has been discussed in fields ranging from statistical and mathematical physics to climate, finance, and ecology. Herein, we study extreme value statistics (EVS) of stochastic resetting systems, which have recently gained significant interest due to its ubiquitous and enriching applications in physics, chemistry, queuing theory, search processes, and computer science. We present a detailed analysis for the finite and large time statistics of extremals (maximum and arg-maximum, i.e., the time when the maximum is reached) of the spatial displacement in such system. In particular, we derive an exact renewal formula that relates the joint distribution of maximum and arg-maximum of the reset process to the statistical measures of the underlying process. Benchmarking our results for the maximum of a reset trajectory that pertain to the Gumbel class for large sample size, we show that the arg-maximum density attains a uniform distribution independent of the underlying process at a large observation time. The results are augmented with a wide spectrum of Markov and non-Markov stochastic processes under resetting, namely, simple diffusion, diffusion with drift, Ornstein-Uhlenbeck process, and random acceleration process in one dimension. Rigorous results are presented for the first two setups, while the latter two are supported with heuristic and numerical analysis.

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