[Talk 24] Exact statistics of record increments of random walks and Levy flights

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In this talk, I will present an analytical study of the statistics of increments in record values in a time series {x_0=0,x_1, x_2, ..., x_n} generated by the positions of a random walk (discrete time, continuous space) of duration n steps. For arbitrary jump length distribution, including Lévy flights, we show that the distribution of the record increment becomes stationary, i.e., independent of n for large n, and compute it explicitly for a wide class of jump distributions. In addition, we compute exactly the probability Q(n) that the record increments decrease monotonically up to step n. Remarkably, Q(n) is universal (i..e., independent of the jump distribution) for each n, decaying as Q(n) ~ A/\sqrt{n} for large n, with a universal amplitude A = e/\sqrt{\pi} = 1.53362.....