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The cost of stochastic resetting

Tuesday, 26 September 2023 11:00 (40 minutes)

Resetting a stochastic process has been shown to expedite the completion time of some complex tasks, such as finding a target for the first time. In this talk we consider the cost of resetting by associating a cost to each reset, which is a function of the distance travelled during the reset event.

We show some unexpected results. First, in the limit of a vanishing resetting rate, the mean total cost is finite for a linear cost function and diverges for a super-linear cost function. This result contrasts with the case of no resetting where the cost is always zero. Second, the resetting rate that minimises the time to completion, including the total resetting cost, is reduced from the case of no cost for a linear cost function, remains unchanged for a quadratic cost function but may be increased for a super-quadratic cost function. In the latter case an increased rate of resetting reduces the chance of costly resets.

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