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False vacuum decay and a new sampling method for rare events

Wednesday 5 November 2025 09:00 (20 minutes)

We present a new Monte Carlo sampling method to calculate the rate at which probability flows out of a meta-stable regime in a complex system. In field theory, this method could be used to calculate false vacuum decay rates. The original probability distribution of the system is multiplied by a simple re-weighting function which guarantees that the system transitions between the meta-stable and stable regimes within a specified range of time. We then perform series of subset simulations with the re-weighting function gradually removed. By combining the results of these simulations, we get the change in the transition probability during the specified time range. Because the re-weighting function is known from the beginning, all simulations can be performed in parallel, or even combined into a single Monte Carlo simulation.

Parallel Session (for talks only)

Algorithms and artificial intelligence

Authors: SWAIM, Joshua (University of Connecticut); Prof. JIN, Luchang (University of Connecticut)

Presenter: SWAIM, Joshua (University of Connecticut)

Session Classification: Algorithms and artificial intelligence