

Second MODE Workshop on Differentiable Programming for Experiment Design



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Automatic differentiation for Monte Carlo processes

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Automatic Differentiation (AD) techniques allow to determine the Taylor expansion of any deterministic function. The generalization of these techniques to stochastic problems is not trivial. In this work we explore two approaches to extend the ideas of AD to Monte Carlo processes, one based on reweighting (importance sampling) and another one based on the ideas from the lattice field theory community (numerical stochastic perturbation theory using the Hamiltonian formalism). We show that, when convergence can be guaranteed, the approach based on NSPT is able to converge to the Taylor expansion with a much smaller variance.

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