



Contribution ID: 189

Type: **Parallel Talk**

The dependence of observables on action parameters

Wednesday, 2 August 2023 09:40 (20 minutes)

Many applications in Lattice field theory require to determine the Taylor series of observables with respect to action parameters. A primary example is the determination of electromagnetic corrections to hadronic processes. We show two possible solutions to this general problem, one based on reweighting, that can be considered a generalization of the RM123 method. The other based on the ideas of Numerical Stochastic Perturbation Theory (NSPT) in the Hamiltonian formulation. We show that 1) the NSPT-based approach shows a much reduced variance in the determination of the Taylor coefficients, and 2) That both approaches are related by a change of variables. Numerical results are shown for the case of $\Lambda\text{-}\phi^4$ in 4 dimensions, but we expect these observations to be general. We conclude by commenting on the possible use of Machine Learning techniques to find similar change of variables that can potentially reduce the variance in Taylor coefficients.

Topical area

Algorithms and Artificial Intelligence

Primary author: CATUMBA, Guilherme (IFIC)**Co-authors:** RAMOS, Alberto (IFIC - Valencia); Dr ZALDÍVAR, Bryan (IFIC)**Presenter:** CATUMBA, Guilherme (IFIC)**Session Classification:** Algorithms and Artificial Intelligence