



LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS

LEPP Joint Seminar



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Neural Network-Based Approach to Phase Space Integration

Monte Carlo methods are widely used in particle physics to integrate and sample probability distributions (differential cross sections or decay rates) on multi-dimensional phase spaces. We present a Neural Network algorithm optimized to perform this task. The algorithm has been applied to several examples of direct relevance for particle physics, including situations with non-trivial features such as sharp resonances and soft/collinear enhancements. Excellent performance has been demonstrated in all examples, with the properly trained NN achieving unweighting efficiencies of between 30% and 75%. In contrast to traditional Monte Carlo algorithms such as VEGAS, the NN-based approach does not require that the phase space coordinates be aligned with resonant or other features in the cross section.

Friday, Nov. 2, 2018

12:30pm

401 Physical Sciences Bldg.