

Machine learning reweighting of MC parameters and MC samples of top quark production in CMS

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Particle physics relies on Monte Carlo (MC) event generators for theory-data comparison, necessitating several samples to address theoretical systematic uncertainties at a high computational cost. The MC statistic becomes a limiting factor and the significant computational cost a bottleneck in most physics analyses. In this talk, the Deep neural network using Classification for Tuning and Reweighting (DCTR) is used to reweight simulations to different models or model parameters by using the full event kinematic information. This methodology avoids the need for simulating the detector response multiple times by incorporating the relevant variations in a single sample. In this talk, DCTR is evaluated for the reweighting of two systematic uncertainties in MC simulations of top quark pair production in the CMS experiment. Additionally, it is investigated for reweighting a next-to-leading-order generator to a next-to-next-to-leading-order generator for top quark pair production.

Alternate track

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Yes

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