

Machine learning approaches for parameter reweighting in MC samples of top quark production in CMS

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In high-energy particle physics, complex Monte Carlo simulations are needed to connect the theory to measurable quantities. Often, the significant computational cost of these programs becomes a bottleneck in physics analyses. In this contribution, we evaluate an approach based on a Deep Neural Network to reweight simulations to different models or model parameters, using the full kinematic information in the event. This methodology avoids the need for simulating the detector response multiple times by incorporating the relevant variations in a single sample. We test the method on Monte Carlo simulations of top quark pair production used in CMS, that we reweight to different SM parameter values and to different QCD models.

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