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Refinement of jet simulations using Wasserstein distance

In High Energy Physics, the interaction of particles with matter at the detectors are best simulated with the GEANT4 software. Alternatively, less precise but faster simulations are sometimes preferred to reach higher statistical precision. We present recent progress of refinement of fast simulations with ML techniques to enhance the quality of such fast simulations. We demonstrate the use of adversarial networks in the context of jet simulation using a Wasserstein loss function. The architecture consists of two opposing networks, Refiner and Critic. The Refiner, refines the distribution of the energy of the jets obtained with the fast simulation. The Critic is used to effectively differentiate between the distributions of refined energy and the distribution obtained by the GEANT4 simulation. The Refiner can be used solely to obtain a fast but refined jet simulation.

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