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Using neural networks to generate cross section data from theoretical QCD parameters RIDA SHAHID, ELENI TSITINIDI, Davidson College, YASIR ALANAZI, MANAL ALMAEEN, Old Dominion University, MICHELLE KUCHERA, Davidson College, YAOHANG LI, Old Dominion University, WALLY MELNITCHOUK, Jefferson Lab, RAGHU RAMANUJAN, Davidson College, NOBUO SATO, Jefferson Lab — Theoretical codes are used to map from the theoretical Quantum Chromodynamics parameter space into observable cross-section space. For QCD applications, each sample in the multidimensional parameter space is processed with respect to observables across all kinematics. This is a time-consuming way of generating cross section data, and we propose using a neural network architecture to quickly and accurately mimic the experimental high-energy scattering data. A neural network is trained on a subset of the QCD parameter space that characterize nucleon structure. The trained model can then quickly generate large amounts of cross section data satisfying the multidimensional parameter distribution. The augmented data can be used in a variety of applications, one of which is to serve as training samples for the inverse problem of mapping to multiple solutions in parameter space. The results can also be useful in establishing a new paradigm for the analysis of various high-energy reactions.

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