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HiDA: Interpreting Negative Density Terms of Probability Density Functions in Probabilistic Machine Learning Models

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In a quantum mechanical process, perturbative calculations, such as in proton-proton collisions at the LHC, can introduce negative density terms as the perturbative series increases to higher order. Consequently, numerical sampling techniques (e.g. Monte Carlo) result in data points with either positive or negative weights. This is an issue for probabilistic machine learning-based algorithms since they only function under the positive-definite probability density paradigm. The work that will be presented will be a short update of an on-going Helmholtz Information & Data Science Academy funded project aimed at developing generic solutions to negatively weighted data in neural-based machine learning models by extending the regime of probabilistic machine learning models to be negative weight safe.

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