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Precision-Machine Learning for the Matrix Element Method

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The matrix element method is the LHC inference method of choice for limited statistics. We present a dedicated machine learning framework, based on efficient phase-space integration, a learned acceptance and transfer function. It is based on a choice of INN and diffusion networks, and a transformer to solve jet combinatorics. Bayesian networks allow us to capture network uncertainties, bootstrapping allows us to estimate integration uncertainties. We showcase this setup for the CP-phase of the top Yukawa coupling in associated Higgs and single-top production.

Significance

Experiment context, if any

References

Paper: arXiv: 2310.07752 ;
Paper from 2022 that we are building on: arXiv: 2210.00019 ;

Slides: https://indico.cern.ch/event/1311972/contributions/5705529/attachments/2773167/4832338/Wien2023.pdf

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