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Efficient machine learning for statistical hypothesis testing

Traditional statistical methods are often not adequate to perform inclusive and signal-agnostic searches at modern collider experiments delivering large amounts of multivariate data. Machine learning provides a set of tools to enhance analyses in large scale regimes, but the adoption of these methodologies comes with new challenges, such as the lack of efficiency and robustness, and potential hidden biases. In this talk, I will discuss these aspects in the context of a recent proposal for a likelihood-ratio-based goodness-of-fit test powered by large-scale implementations of kernel methods, nonparametric learning models that can approximate any continuous function given enough data.

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