

The RooStats project

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RooStats is a project to create advanced statistical tools required for the analysis of LHC data, with emphasis on discoveries, confidence intervals, and combined measurements.

The idea is to provide the major statistical techniques as a set of C++ classes with coherent interfaces, which can be used on arbitrary model and datasets in a common way. The classes are built on top of RooFit, which provides a very convenient functionality for modeling the probability density functions or the likelihood functions, required as inputs for any statistical technique. Furthermore, RooFit provides via the RooWorkspace class, the functionality for easily creating models, for analysis combination and for digital publication of the likelihood function and the data.

We will present in detail the design and the implementation of the different statistical methods of RooStats. These include various classes for interval estimation and for hypothesis test depending on different statistical techniques such as those based on the likelihood function, or on frequentists or bayesian statistics. These methods can be applied in complex problems, including cases with multi parameter of interests and various nuisance parameters. We will also show some example of usage and we will describe the results and the statistical plots obtained by running the RooStats methods.

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