

Fitting functions to data in 10 Julia ways

Tuesday 29 July 2025 15:30 (1 hour)

There are two main kinds of “fitting” in HEP – fitting function to data, and template fitting for statistical analysis. The two are linked, but each has enough depth to warrant a dedicated tutorial.

This tutorial connects familiar concept in HEP to best practices in Julia ecosystem. We go through the following topics:

- Simple curve fitting by minimizing Chi2, we use this as an opportunity to show Optimization.jl, which allows switching and combine numerical backend easily, as well as Minuit2.jl, which HEP audience are familiar with.
- Binned and Unbinned maximal likelihood fit of a well-defined PDF function
- Binned maximal likelihood fit for “extended PDF” and “sums” of PDFs - we introduce the math and also uses AlgebraPDF.jl developed by LHCb Julia users.
- Finally, we show some “future” tech such as SymbolicRegression.jl and evaluating Unbinned likelihood on GPUs to show users what is possible in the future for analysis.

Session Classification: Talks