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## evermore: Differentiable Binned Likelihood Functions with JAX

Statistical analyses in high energy physics often rely on likelihood functions of binned data. These likelihood functions can then be used for the calculation of test statistics in order to assess the statistical significance of a measurement.

evermore is a python package for building and evaluating these likelihood functions using JAX –a powerful python library for high performance numerical computing. The key concepts of evermore are performance and differentiability. JAX provides automatic differentiation, just-in-time (jit) compilation, and vectorization capabilities, which can be leveraged to improve the performance of statistical analyses. Jit-compilation and vectorization can be used for parallelizing fits on GPUs which is especially advantageous for likelihood scans and toy based upper limits.

We present the concepts of evermore, show its features, and give concrete examples of its performance in the context of a CMS analysis.

## Significance

## References

## Experiment context, if any

CMS experiment

Author: CMS COLLABORATION

Presenter: CMS COLLABORATION

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