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The world of coding Feynman Integrals

Tuesday 4 November 2025 14:00 (5 minutes)

In particle physics, there are currently running experiments (CERN, Fermilab, PSI, etc) that look for evidence of new physics. Many of these results show deviations between the experiment and the theoretical predictions. We therefore need input from the theory side, to better understand our current Standard Model –the theory that describes the interaction between the fundamental particles of our Universe.
This heavily relies on the evaluation of Feynman diagrams –diagrammatic representation of mathematical expressions that describe interactions between particles. In order to meet the precision demanded by the experiments, Feynman integrals need to be evaluated –whose number increases exponentially as we go for more precise computations.
The evaluation of this Feynman integrals requires a strong component of algorithms and are data intensive.

The aim of this poster is to show how mathematical techniques such as diagram generation, amplitude generation, tensor decomposition, partial fractioning, integration by parts and analytical results for integrals – fundamental for our calculations –can be computationally implemented.
We will cover the building blocks of the code developed during my PhD to compute Feynman amplitudes. We will also show some examples of codes developed in the particle physics community in software packages such as Mathematica, FORM and C++.

Confirm eligibility

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