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# Novel methods for analytic Feynman integral computation based on algebraic geometry

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Feynman integrals are key objects in quantum field theory. They are crucial for the perturbative evaluation of scattering amplitudes, which leads to observables in high-energy experiments. Recently, multi-loop Feynman integral computation has become a popular field. It corresponds to high-precision predictions for experiments. Thus, they are very important for higher-order validation of the Standard Model (SM) and in the search for clues to new physics beyond the SM. Nowadays, multi-loop Feynman integral evaluation is facing challenges brought by its heavy computation. These challenges prevent us from evaluating the Feynman integrals necessary for high-precision experimental processes. In this talk, I will introduce some efforts that we have made to face these challenges. I will demonstrate that some new mathematical tools, like algebraic geometry, are very helpful in developing new algorithms, which, in a great manner, decrease the computation expense for some bottleneck steps in Feynman integral computations. I will also show the latest development of new packages based on these algorithms.

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