

Contribution ID: 611 Contribution code: **contribution ID 611**Type: **Oral**

The Higgs plus three-gluon amplitude at one loop with pySecDec

Thursday, 2 December 2021 11:20 (20 minutes)

We present an application of major new features of the program pySecDec, which is a program to calculate parametric integrals, in particular multi-loop integrals, numerically.

One important new feature is the ability to integrate weighted sums of integrals in a way which is optimised to reach a given accuracy goal on the sums rather than on the individual integrals, another one is the option to perform asymptotic expansions.

These new assets of the program represent an important step towards the efficient evaluation of multi-loop amplitudes in a largely automated way. The poster will illustrate them in a pedagogical example, through the calculation of the one-loop amplitude for Higgs plus jet production in the gluon channel, mediated by a top quark loop. Numerical results in the heavy top limit, which can also be obtained with the new version of pySecDec, will be shown as well.

Significance

Illustrates important new features of the program pySecDec in a physics application which is simple enough to teach new users of the program how to use it for multi-loop applications.

References

<https://arxiv.org/abs/2108.10807>,
<https://github.com/gudrunhe/secdec>

Speaker time zone

Compatible with Asia

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Session Classification: Track 3: Computations in Theoretical Physics: Techniques and Methods

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