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Master Integrals for $q\bar{q} \to t\bar{t}$ scattering at NNLO

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The large production rate of top quarks at LHC enables precision studies of top quark observables, which potentially could uncover evidence for new physics. In order to achieve this the precision studies have to be met with equally precise theory predictions. One of the key processes is top quark pair production through the annihilation of a quark pair. While numerical representations already exist at the two-loop level, analytic results remain desirable. In this talk I will report on the analytic calculation of the remaining master integrals needed for this process. In particular I will show how the method of differential equations was employed to calculate the integrals and how the latter can be analytically continued into the top quark production region. The presented calculation completes all ingredients necessary for the two-loop amplitude computation, hence proving that its analytic evaluation is feasible.

Primary author: Mr SCHUBERT, Ulrich (Universtiy at Buffalo)

Presenter: Mr SCHUBERT, Ulrich (Universtiy at Buffalo)

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