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One-loop QCD helicity amplitudes for $pp \to t\bar{t}j$ to $O(\epsilon^2)$

We report on a recent computation for the helicity amplitudes for the one-loop QCD corrections to top-quark pair plus jet production. We provide corrections up to $O(\epsilon^2)$ in dimensional regularisation for the first time which are relevant at NNLO. The amplitudes depend on four different pentagon integral topologies, for which we discuss the solution in terms of generalised power series expansions, the canonical form structure of the differential equations and the computation of the boundary values.

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