

Analytic Two-Loop Five-Parton QCD Amplitudes from Numerical Unitarity

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We present the analytic form of all two-loop five-parton helicity amplitudes required for the calculation of NNLO QCD corrections to the production of three jets at hadron colliders in the leading-color approximation. The results are analytically reconstructed from exact numerical evaluations over finite fields. We employ a number of physics-motivated ideas to facilitate the reconstruction, as well as an optimized approach to the numerical treatment of particle states in D dimensions. This allows to obtain the analytical expressions with a modest computational effort. Systematic simplification of the amplitudes using multivariate partial-fraction decomposition leads to a particularly compact form.

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