

Two-loop master integrals for single-top production

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The single-top production via electroweak interactions is important for studying the top quarks. One can further identify three channels in the single-top production mode, namely the t-channel, the tW associated production, and the s-channel, in the order of descending cross section at the LHC. The complete NNLO QCD corrections to single-top production involve complicated two-loop Feynman integrals with many scales at play, which makes it challenging to calculate them analytically. We present here the calculations of parts of the requisite two-loop master integrals for the single-top production at NNLO QCD. We mainly focus on the part whose differential equations can be cast into the canonical form. Complex square roots appear in the canonical differential equations. It turns out that the solutions can be expressed by multiple polylogarithms by making appropriate variable changes or simultaneously doing an expansion on one of the kinematic variables.

Summary

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