

A general mass variable flavor number scheme for Z boson production in association with a heavy quark at hadron colliders

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We present a methodology to streamline implementation of massive-quark radiative contributions in calculations with a variable number of active partons in proton-proton collisions. The methodology introduces subtraction and residual heavy-quark parton distribution functions (PDFs) to implement calculations in the Aivazis-Collins-Olness-Tung (ACOT) factorization scheme and its simplified realization in various processes up to the next-to-the-next-to-leading order in the QCD coupling strength. Interpolation tables for bottom-quark subtraction and residual distributions for CT18 NLO and NNLO PDF ensembles are provided in the common LHAPDF6 format. A numerical calculation of Z-boson production with at least one b jet at the Large Hadron Collider beyond the lowest order in QCD is considered for illustration purposes.

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