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Heavy Quark Production in the ACOT Scheme at NNLO and N3LO

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We analyze the properties of the ACOT scheme for heavy quark production and make use of the MS-bar massless results at NNLO and N3LO for the structure functions F2 and FL in neutral current deep-inelastic scattering to estimate the higher order corrections. For this purpose we decouple the heavy quark mass entering the phase space from the one entering the dynamics of the short distance cross section. We show numerically that the phase space mass is generally more important. Therefore, the dominant heavy quark mass effects at higher orders can be taken into account using the massless Wilson coefficients together with an appropriate slow-rescaling prescription implementing the phase space constraints. Combining the exact ACOT scheme at NLO with these expressions should provide a good approximation to the missing full calculation in the ACOT scheme at NNLO and N3LO.

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