

Generating Functions, Mellin Transformations and Twist-2 Operator Matrix Elements in QCD

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Twist-2 operators play an important role in QCD: they arise from the operator product expansion in deep-inelastic scattering and underlie the definition of collinear parton distribution functions (PDFs). We discuss the calculation of heavy quark contributions to matrix elements of these twist-2 operators at three-loop order in QCD. These matrix elements serve as matching coefficients to connect PDFs with different number of active quark flavours and enter the description of heavy quark contributions to deep-inelastic scattering. Different aspects of the problem are most suitably treated in three different mathematical spaces. They are connected by Mellin transformations and generating functions. We highlight interesting connections between these spaces, in particular how to compute the inverse Mellin transformation using generating functions and analytic continuation. These connections generalise also beyond the context of twist-2 operators in QCD.

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