

Ablinger, J.; Behring, A.; Blümlein, J.; De Freitas, A.; Hasselhuhn, A.; von Manteuffel, A.; Round, M.; Schneider, C.; Wißbrock, F.

The 3-loop non-singlet heavy flavor contributions and anomalous dimensions for the structure function $F_2(x, Q^2)$ and transversity. (English) Zbl 1325.81168
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Summary: We calculate the massive flavor non-singlet Wilson coefficient for the heavy flavor contributions to the structure function $F_2(x, Q^2)$ in the asymptotic region $Q^2 \gg m^2$ and the associated operator matrix element $A_{qq, Q}^{(3), NS}(N)$ to 3-loop order in Quantum Chromodynamics at general values of the Mellin variable N . This matrix element is associated with the vector current and axial vector current for the even and the odd moments N , respectively. We also calculate the corresponding operator matrix elements for transversity, compute the contributions to the 3-loop anomalous dimensions to $O(N_F)$ and compare to results in the literature. The 3-loop matching of the flavor non-singlet distribution in the variable flavor number scheme is derived. All results can be expressed in terms of nested harmonic sums in N space and harmonic polylogarithms in x -space. Numerical results are presented for the non-singlet charm quark contribution to $F_2(x, Q^2)$.

MSC:

- 81V05 Strong interaction, including quantum chromodynamics
- 81U35 Inelastic and multichannel quantum scattering
- 81T18 Feynman diagrams
- 11G55 Polylogarithms and relations with K -theory
- 81T80 Simulation and numerical modelling (quantum field theory) (MSC2010)

Cited in 6 Documents

Software:

[Axodraw](#); [Fermat](#); [HarmonicSums](#); [MATAD](#)

Full Text: [DOI](#)

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