

# Soft-gluon effective coupling: perturbative results and the large- $n_F$ limit to all orders

*Saturday 20 July 2024 15:45 (15 minutes)*

We consider extensions of the soft-gluon effective coupling that generalize the Catani-Marchesini-Webber (CMW) coupling in the context of soft-gluon resummation beyond the next-to-leading logarithmic accuracy. Starting from the probability density of correlated soft emission in  $d$  dimensions we introduce a class of soft couplings relevant for resummed QCD calculations of hard-scattering observables. We show that at the conformal point, where the  $d$ -dimensional QCD beta-function vanishes, all these effective couplings are equal to the cusp anomalous dimension. We present explicit results in  $d$  dimensions for the soft-emission probability density and the soft couplings at the second-order in the QCD coupling. Finally, we study the structure of the soft coupling in the large- $n_F$  limit and we present explicit expressions to all orders in perturbation theory. We also check that, at the conformal point, our large- $n_F$  results agree with the known result of the cusp anomalous dimension.

## Alternate track

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