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## On Next-to-Soft Resummation to Inclusive Cross-sections and Rapidity distributions

We present a formalism that resums threshold enhanced large logarithms to all orders in perturbation theory for the production of a pair of leptons in Drell-Yan process and of Higgs boson in gluon fusion as well as in bottom quark annihilation. As for the inclusive cross-section, the rapidity distribution is a prime candidate to benefit from threshold resummation, hence we apply the same formalism to rapidity distributions for the aforementioned processes as well. We use collinear factorization and renormalization group invariance to achieve this.

We find that the resummed result is a solution to Sudakov type differential equation and hence it can predict soft plus virtual (SV) contributions as well as next to SV (NSV) contributions to all orders in the strong coupling constant.

The  $z$  space resummed result is shown to have an integral representation which allows us to resum the large logarithms of the form  $\log^i(N)$  retaining  $1/N$  corrections resulting from NSV terms. We also show that in  $N$  space, tower of logarithms  $a_s^n/N^\alpha \log^{2n-\alpha}(N)$ ,  $a_s^n/N^\alpha \log^{2n-1-\alpha}(N) \dots$  etc for  $\alpha = 0, 1$  are summed to all orders in  $a_s$ .

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