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Computation of NLO processes involving heavy quarks using Loop-Tree Duality

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We present a new method to compute higher-order corrections to physical cross-sections, at Next-to-Leading Order and beyond. This method, based on the Loop Tree Duality, leads to locally integrable expressions in four dimensions. By introducing a physically motivated momentum mapping between the momenta involved in the real and the virtual contributions, infrared singularities naturally disappear at integrand level, without the need to introduce subtraction counter-terms. Ultraviolet singularities are dealt with using dual representations of suitable counter-terms, with some subtleties regarding the self-energy contributions. We first apply this method to a $1 \rightarrow 2$ scalar process, and then compute the decay rate for $H \rightarrow q\bar{q}$, $\gamma \rightarrow q\bar{q}$ and $Z \rightarrow q\bar{q}$.

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