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Master integrals for the mixed QCD-QED corrections to the Drell-Yan process with lepton mass dependence

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The Drell-Yan(DY) processes are one of the cutting-edge topics in physics at the LHC. In order to include the logarithmic contributions of lepton mass in the mixed QCD-QED corrections to the charged-current DY process, the requisite two-loop master integrals must be calculated with a massive lepton. These integrals are computed analytically by using the differential equation method. A suitable choice of master integrals makes it successful to cast the differential equation system into the canonical form. The lepton mass is kept in the building of differential equations and then the system is expanded against the ratio of small lepton mass to large vector boson mass. All the master integrals are present in the form of a Taylor series around four space-time dimensions with the coefficients being expressed by Goncharov polylogarithms up to weight 4.

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