A. massive quarks

1,2 loops: analytically known /Källen, Sabry, Dan (1955); Reinders, Rubinstein, Yazaki (1980); Broadhurst (1981)/

3 loops ($\mathcal{O}(\alpha_s^2)$): known (semi)-analytically /K.Ch, Kühn, Steinhauser (1996)/ (important tools: the Padé approximants and conformal mapping /Fleischer,Tarasov (1994) and Baikov, Broadhurst (1995)/)

B. massless quarks

4-loops ($\mathcal{O}(\alpha_s^3)$): known (see next slide)

C. light ($m_q \ll E$) quarks

quadratic and quartic terms in quark mass expansion are analytically known in 4 loops /K.Ch, Kühn (1990,1994), K.Ch., Kühn, Harlander(2000)/

D. 5-loops ($\mathcal{O}(\alpha_s^4)$): under attack now