Massive Feynman diagrams, hypergeometric functions and series.

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Abstract

Perturbative calculation of radiative corrections to any physical process is reduced to calculation of Feynman diagrams. In framework of dimensional regularization, a Feynman diagram can be presented as multiple hypergeometric series, with parameters are linear combination of dimension of space-time and power of propagators (also integer number) and arguments are functions of mass and momentum of diagram. However, for practical application the analytical form of the coefficient of ε-expansion (ε is deviation of d-dimensional space-time from some fixed integer value) is needed. These coefficients are related to the derivatives of hypergeometric functions with respect to their parameters. In this talk, we review some recent results devoted to construction of higher-order coefficients of ε-expansion. In particular, the functions, arising in framework of ε-expansion (Nielsen polylogarithms, generalised log-sine functions, harmonic polylogarithms) and their relation with multiple (inverse) binomial sums and Euler-Zagier sums will be discussed.