Exercises for the course "Feynman integrals"
Sheet 4

Exercise 6

Let $\vec{I} = (I_{\nu_1}, ..., I_{\nu_{N_{\text{master}}}})^T$ be a set of master integrals, which satisfies the differential equation

$$(d+A)\vec{I} \quad = \quad 0.$$

Let $\vec{I}'$ be another set of master integrals, related to the first one by an invertible $N_{\text{master}} \times N_{\text{master}}$-matrix $U(\varepsilon, x)$:

$$\vec{I}' \quad = \quad U\vec{I}.$$

Show that $\vec{I}'$satisfies the differential equation

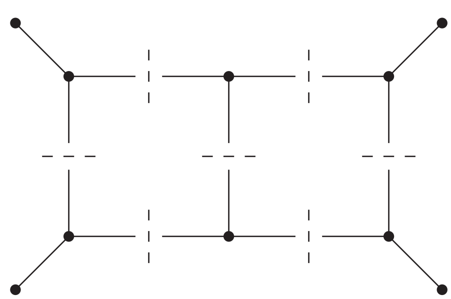
$$\left(d+A'\right)\vec{I}' \quad = \quad 0$$

with

$$A' \quad = \quad UAU^{-1} + UdU^{-1}.$$

Exercise 7

Work out a one-dimensional integral representation for the maximal cut of the double box integral $I_{111111100}$ (kinematics and definition of $\tilde{G}$ as in exercise 5)



To work out the maximal cut it is simpler to use a loop-by-loop approach: First write down a Baikov representation for a one-loop sub-graph, and then a second Baikov representation for the second loop.