

(Note: This document read best using a proper Markdown renderer like the one in VScode with the extension “Markdown All in One”. Alternatively, you can create a pdf file with `pandoc README.md -o README.pdf`)

Integral topologies

The integral topologies are listed in the file `topologyList.m`. The notation used is `{"name", {set of denominators}, {set of loop momenta}}`. The mass `M1` denotes the bottom mass while the mass `M2` denotes the charm mass.

Integral measure

For a master integral I , the integral measure is defined by

$$I = \int \int \int \frac{d^d p_1}{i\pi^{d/2}} \frac{d^d p_2}{i\pi^{d/2}} \frac{d^d p_3}{i\pi^{d/2}} e^{3\epsilon\gamma_E} \left(\frac{\mu^2}{m_b^2} \right)^{-3\epsilon} \frac{1}{D_1^{n_1} \dots D_k^{n_k}},$$

where $d = 4 - 2\epsilon$ is the spacetime dimension, γ_E is the Euler-Mascheroni constant, μ is the renormalisation scale, m_b is the bottom mass and D_i are the denominators with exponents n_i as specified by the list of denominators in the topology file.

Semianalytic results file

The master integrals are given as an expansion around $m_c/m_b = 0$ as a list of Mathematica replacement rules in the file `MIs.m`. The notation is explained in the table below.

Symbol	Meaning
<code>I</code>	i
<code>z</code>	m_c^2/m_b^2
<code>Log</code>	\log
<code>ep</code>	ϵ
<code>WARNep</code>	Missing higher order terms

Example files for asymptotic expansion

In order to run the code showcasing asymptotic expansion you need to install the development versions of `FeynCalc` and `FeynHelpers`. This can be done using the following code evaluated in Mathematica

```
Import["https://raw.githubusercontent.com/FeynCalc/feyncalc/master/install.m"]
```

```
InstallFeynCalc[InstallFeynCalcDevelopmentVersion -> True]  
Import["https://raw.githubusercontent.com/FeynCalc/feynhelpers/master/install.m"]  
InstallFeynHelpers[InstallFeynHelpersDevelopmentVersion->True]
```

Furthermore, you need to set up the IBP-reduction tool FIRE which can be obtained from [\[https://gitlab.com/feynmanintegrals/fire\]](https://gitlab.com/feynmanintegrals/fire)

It is recommended to place the program to

```
FileNameJoin[{$UserBaseDirectory, "Applications", "FIRE6", "bin", "FIRE6"}]
```

Otherwise, the option FIREBinaryPath of the routines belonging to the FIRE-interface must be adjusted accordingly.