What this code is about

The `c++` source code `constant.cpp` solves the system of $d+1$ linear equations for the first $d+1$ expansion coefficients c_m

$$a_{n+2} = \sum_{m=0}^{d} c_m P(n,m) \tag{1}$$

where the matrix $P(n,m)$ is given by

$$P(n,m) = m! 2^{2n+2} \sum_{k=0}^{m} \frac{(-2)^k \, (2n+k+1)!}{(k!)^2 (m-k)!}. \tag{2}$$

The matrix elements are read-in from the file `matrix_p.txt`. In the case of the Heisenberg-Euler Lagrangian in a purely electric background, the input a_{n+2} are the first $d+1$ coefficients of the divergent weak magnetic field expansion given in equation (3.3),

$$f(\kappa) = \sum_{n=2}^{\infty} a_n \kappa^n, \qquad \kappa \to 0. \tag{3}$$

These are read from the file `moments.txt`. The code writes to the file `constant.txt` the quantity $c_m m!$ which will be relevant the reconstruction in equation (4.23)

$$g(x) = e^{-x/2} \sum_{m=0}^{\infty} c_m m! \sum_{k=0}^{m} \frac{(-x)^k}{(k!)^2 (m-k)!}. \tag{4}$$

and in the subsequent computations.

The file `run.sh` encapsulates commands to build and run the application using the `CMakeLists.txt` on a local machine running on Ubuntu 24.04.