
What this code is about

The C++ code `second.cpp` computes the second term in equation (3.10)

$$\sum_{k=0}^{\infty} \frac{(-1)^k \mu_{-(k+1)}}{\beta^k} = \sum_{k=0}^d \frac{(-1)^k}{\beta^k} (A_k + B_k + C_k) + \sum_{k=d+1}^{\infty} \frac{(-1)^k}{\beta^k} D_k, \quad (1)$$

where

$$B_k = \sum_{m=k+1}^d c_m m! \sum_{l=0}^k \frac{(-1)^l}{(l!)^2 (m-l)!} \int_0^{\infty} \frac{e^{-x/2}}{x^{k+\nu+1-l}} dx, \quad (2)$$

and

$$\int_0^{\infty} \frac{e^{-x/2}}{x^{k+\nu+1-l}} dx = \frac{(-1)^{k-l+1} \left(\frac{1}{2}\right)^{k-l+1+\nu} \pi}{\Gamma(k-l+1+\nu) \sin(\pi\nu)}. \quad (3)$$

The code requires the $d+1$ numbers c_m 's as inputs. These are read-in from the file `Constants.txt`. The code outputs values for various β contained in the file `SECOND.txt`.

The file `compile.job` is a SLURM script to compile the code in an HPC and generate an executable.

The file `together.job` is a SLURM script to run the executable in an HPC.

The file `mpfr.sh` is a shell script used to compile and run the code in an Ubuntu 22.04 local machine.