
What this code is about

The `c++` code `function.cpp` computes the second term in the right-hand side of equation (4.20) in the paper,

$$f(\beta) = \sum_{k=0}^{\infty} \frac{(-1)^k}{\beta^{k-1}} \mu_{-(2k+2)} + \beta \Delta(\beta). \quad (1)$$

where

$$\Delta(\beta) = \frac{\pi\sqrt{\beta}}{4} \left(\rho\left(\frac{i}{\sqrt{\beta}}\right) + \rho\left(\frac{-i}{\sqrt{\beta}}\right) \right) + \frac{\sqrt{\beta} \ln \beta}{4i} \left(\rho\left(\frac{i}{\sqrt{\beta}}\right) - \rho\left(\frac{-i}{\sqrt{\beta}}\right) \right), \quad (2)$$

and

$$\rho(x) = x e^{-x/2} \sum_{m=0}^d c_m m! \sum_{k=0}^m \frac{(-x)^k}{(k!)^2 (m-k)!}. \quad (3)$$

The code requires the $d+1$ numbers c_m 's as inputs. These are read-in from the file `../Constant/Constants.txt`. The code outputs values for $\beta = 10^{-5} - 10^{23}$, 0.2 and $\beta = 4$ and writes to the file `../results/FIFTH.txt`.

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