

Numerical methods and F90, fall 2015

Exercise 6

1. Make a program to simulate coin flipping. Study how the ratio of heads/coins behaves as the number of tosses increases.
2. Use the explicit Euler's method to solve the equation

$$y' = x - y$$

in the range $0 \leq x \leq 1$ with the initial value $y(0) = 0$.

3. Implement the implicit Euler method as a function and solve the equation

$$y' = x - y$$

in the range $0 \leq x \leq 1$ using the initial value $y(0) = 0$. (The exact solution is $y = e^{-x} + x - 1$). Investigate the accuracy of the solution at $x = 1$ as a function of the step size.

4. Use the fourth order Runge-Kutta to solve the equation of the previous problem.