Numerical methods and F90, fall 2015

Exercise 7

Return the solutions by Nov 18.

1. Assume we have found the solution of the equation

   $$y' = x - y$$

   at three points $x_0 = 0$, $x_1 = 0.1$ and $x_2 = 0.2$ ($h = 0.1$) (The exact solution is $y = e^{-x} + x - 1$). Extend the solution to $x = 1$ using an Adams predictor-corrector method.

2. Use the shooting method to solve the equation

   $$y'' + y = x$$

   with the boundary values $y(0) = 1$, $y(\pi/2) = 0$, in the interval $0 \leq x \leq \pi/2$. (The exact solution is $y = x + \cos x - \frac{\pi}{2} \sin x$.)

3. Use a difference method to solve the previous problem.