Exercises Numerical Methods for the Solution of Differential Equations, WS 2015/16

Exercise Sheet 4 (November 20th, 2015). Voluntary!

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Exercise 13. Implement the shooting method for Example 3.8 in the lecture notes. Discuss different step lengths.

$$u'' + uu' = -1\,, \qquad u(0) = u(1) = 0\,.$$

Exercise 14. Find a shooting method for

$$-u'' + c^2 u = c^2 x \text{ in } (0,1)\,, \qquad u(0) = 0, u(1) = 0\,. \tag{1}$$

Exercise 15. Implement the method for solving (1) with different step lengths.

Exercise 16. Solve the Differential equation from Example 3.8 with ode23s (a matlab ode solver). Note you do not specify the step length. This method is based on Fehlberg method. What do you observe in compare with the solutions from Exercise 13.