

Given the equation $y'' = -(x+1)y' + 2y + (1-x^2)e^{-x}$, $0 \leq x \leq 1$, $y(0) = 1$,

$$y(1) = 2$$

use $h = 0.1$

Questions:

- Use the shooting method to approximate the solution of the problem
- Use the finite-difference method to approximate the solution
- Use the variation approach to approximate the solution.

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Shooting Method y-values:
[1.      1.0166 1.0592 1.1243 1.209   1.3105 1.4262 1.5545 1.6938 1.8427
 2.      ]

Finite Difference y-values:
[1.      1.3232 1.5961 1.8154 1.9802 2.0917 2.1529 2.1685 2.1439 2.0856
 2.      ]

Variational Method y-values:
[1.      1.0709 1.1549 1.2487 1.3494 1.4548 1.5629 1.6723 1.7819 1.8912
 2.      ]

Process finished with exit code 0
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