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

$y(1) = 2$

use $h = 0.1$

Questions:

a. Use the shooting method to approximate the solution of the problem

b. Use the finite-difference method to approximate the solution

c. Use the variation approach to approximate the solution.

Ans:

x	Shooting Method	Finite Difference Method	Variation Approach Method
0.0	1.000000	1.000000	1.000000
0.1	1.016634	1.067055	1.122938
0.2	1.059210	1.138856	1.239697
0.3	1.124314	1.216602	1.348042
0.4	1.209024	1.301375	1.449765
0.5	1.310524	1.394118	1.547514
0.6	1.426232	1.495626	1.642312
0.7	1.554455	1.606540	1.734069
0.8	1.693764	1.727355	1.823360
0.9	1.842715	1.858430	1.911659
1.0	2.000000	2.000000	2.000000