P239第1题实验报告

李青林(5110309074)

1. 解方程$x^2 - 3x + 2 - e^x = 0$

   (a) 斯特芬森加速迭代

   $\varphi(x) = \ln(x^2 - 3x + 2)$

k	x_k
1	0.500000000000000
2	0.212191160008787
3	0.256087960816817
4	0.257528819608135
5	0.257530285438346

   (b) 牛顿法

   $$x_{k+1} = x_k - \frac{x^2 - 3x + 2 - e^x}{2x - 3 - e^x}$$

k	x_k
1	0.500000000000000
2	0.253688702418292
3	0.257528900794710
4	0.257530285439682

2. 解方程$x^3 + 2x^2 + 10x - 20 = 0$

   (a) 斯特芬森加速迭代

   $$\varphi(x) = \frac{20 - x^3 - 2x^2}{10}$$

k	x_k
1	1.500000000000000
2	1.362859527908831
3	1.368796780568047
4	1.368808107780163

(b) 牛顿法

$$x_{k+1} = x_k - \frac{x^3 + 2x^2 + 10x - 20}{3x^2 + 4x + 10}$$

k	x_k
1	1.500000000000000
2	1.373626373626374
3	1.368814819623964
4	1.368808107834412