Numerical Methods

计算方法上机题结果

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PS. 所用语言为Python3.5。

2

dichotomy:
(0.09033203125, 11)

iteration:
(0.0905126166743651, 4)

newton:
(0.0905251085833896, 2)

注：第二个数字即为迭代次数

4

[Decimal('1.0138'), Decimal('0.99689'), Decimal('1.0000'), Decimal('0.99891')]

[Decimal('0.99987'), Decimal('1.0001'), Decimal('1.0000'), Decimal('0.99996')]

7

```
('Jacobi:', matrix([[ 0.9999466 ],
    [ 1.99996353],
    [ 0.99992706],
    [ 1.99996353],
    [ 0.99992706],
    [ 1.9999733 ]]))
```

('Iteration times:', 27)

```
('Gauss_Seidel:', matrix([[ 0.99997121],
    [ 1.99995053],
    [ 0.9999399 ],
    [ 1.99993429],
    [ 0.99992214],
    [ 1.99992823]]))
```

('Iteration times:', 14)

```
('SOR: 1.334', matrix([[ 0.99999824],
    [ 2.00000615],
    [ 0.99998594],
    [ 2.00000038],
    [ 1.0000044 ],
    [ 1.99998434]]))
```

('Iteration times', 13)

```
('SOR: 1.95', matrix([[ 0.99984308],
    [ 2.00006705],
    [ 0.99995228],
    [ 1.9998238 ],
    [ 1.00005312],
    [ 1.99987874]]))
```

('Iteration times', 203)

```
('SOR: 0.95', matrix([[ 0.99997105],
    [ 1.99995163],
    [ 0.99994269],
    [ 1.99993808],
    [ 0.99992804],
    [ 1.9999355 ]]))
```

('Iteration times', 16)

9

7.8251

10.4813

12.3635

16.5756

19.0916

25.3864

32.8043

36.6479

35.9171

29.3685

16.7998

0.5427

10

y = 13.4596638655 -3.60530939649 x + 0.267570664629 x^2
(6.73711634547 1.31496943278)

15

96.88448182748297

17

Euler:
xi = 0.0 yi+1 = 1.0 y = 1.0322801154563672
xi = 0.1 yi+1 = 1.0066666666666666 y = 1.0626585691826111
xi = 0.2 yi+1 = 1.0198239843281727 y = 1.091392883061106
xi = 0.3 yi+1 = 1.0390539962106073 y = 1.1186889420813968
xi = 0.4 yi+1 = 1.0637537428400645 y = 1.1447142425533319
xi = 0.5 yi+1 = 1.0932112873753903 y = 1.1696070952851465
xi = 0.6 yi+1 = 1.126680984094971 y = 1.193483191927337
xi = 0.7 yi+1 = 1.163443468397965 y = 1.2164403991146802
xi = 0.8 yi+1 = 1.2028445511319708 y = 1.2385623296301709
xi = 0.9 yi+1 = 1.2443143796968252 y = 1.2599210498948732
Improved Euler:
xi = 0.0 yi+1 = 1.0033333333333334 y = 1.0322801154563672
xi = 0.1 yi+1 = 1.0131804343988517 y = 1.0626585691826111
xi = 0.2 yi+1 = 1.0291712445503087 y = 1.091392883061106
xi = 0.3 yi+1 = 1.0507510799980229 y = 1.1186889420813968
xi = 0.4 yi+1 = 1.077252310612832 y = 1.1447142425533319
xi = 0.5 yi+1 = 1.1079650533583774 y = 1.1696070952851465
xi = 0.6 yi+1 = 1.142194135689444 y = 1.193483191927337
xi = 0.7 yi+1 = 1.1792972842176002 y = 1.2164403991146802
xi = 0.8 yi+1 = 1.2187055755645235 y = 1.2385623296301709
xi = 0.9 yi+1 = 1.2599302658620328 y = 1.2599210498948732
R-K:
xi = 0.0 yi+1 = 1.003322292719565 y = 1.0322801154563672
xi = 0.1 yi+1 = 1.013159438200695 y = 1.0626585691826111
xi = 0.2 yi+1 = 1.029142535439115 y = 1.091392883061106
xi = 0.3 yi+1 = 1.0507176790219044 y = 1.1186889420813968
xi = 0.4 yi+1 = 1.0772174799992722 y = 1.1447142425533319
xi = 0.5 yi+1 = 1.1079318083688698 y = 1.1696070952851465
xi = 0.6 yi+1 = 1.142164929384162 y = 1.193483191927337
xi = 0.7 yi+1 = 1.1792738837804666 y = 1.2164403991146802
xi = 0.8 yi+1 = 1.2186890834104636 y = 1.2385623296301709
xi = 0.9 yi+1 = 1.2599212215820867 y = 1.2599210498948732