1.

```
In [3]: runfile('C:/Users/ericd/untitled0.py', wdir='C:/Users/ericd')
y1(1) = 1.981772, y2(1) = 0.192044, c = 0.094913

最終解:
x        y(x)
0.0      1.000000
0.1      1.023395
0.2      1.063205
0.3      1.127613
0.4      1.211326
0.5      1.312045
0.6      1.427342
0.7      1.555263
0.8      1.694175

驗證: y(0) = 1.000000, y(1) = 2.000000
```

2.

```
In [10]: runfile('C:/Users/ericd/untitled1.py', wdir='C:/Users/ericd')
有限差分法結果:
x        y(x)
0.0      1.000000
0.1      1.016532
0.2      1.059102
0.3      1.124251
0.4      1.208890
0.5      1.310313
0.6      1.426194
0.7      1.554570
0.8      1.693822
0.9      1.842642
1.0      2.000000

驗證: y(0) = 1.000000, y(1) = 2.000000

矩陣 A:
[[ 2.02  -1.055  0.     0.     0.     0.     0.     0.     0.    ]
 [-0.94   2.02  -1.06   0.     0.     0.     0.     0.     0.    ]
 [ 0.    -0.935  2.02  -1.065  0.     0.     0.     0.     0.    ]
 [ 0.     0.    -0.93   2.02  -1.07   0.     0.     0.     0.    ]
 [ 0.     0.     0.    -0.925  2.02  -1.075  0.     0.     0.    ]
 [ 0.     0.     0.     0.    -0.92   2.02  -1.08   0.     0.    ]
 [ 0.     0.     0.     0.     0.    -0.915  2.02  -1.085  0.    ]
 [ 0.     0.     0.     0.     0.     0.    -0.91   2.02  -1.09 ]
 [ 0.     0.     0.     0.     0.     0.     0.    -0.905  2.02 ]]
```

3.

變分法結果：
```
x        y(x)
0.0      1.000000
0.1      1.165300
0.2      1.324159
0.3      1.470785
0.4      1.600614
0.5      1.710757
0.6      1.800270
0.7      1.870227
0.8      1.923601
0.9      1.964955
1.0      2.000000
```

驗證：y(0) = 1.000000, y(1) = 2.000000

矩陣 A：
```
[[5.93480220e+00 1.29032773e-16]
 [1.29032773e-16 2.07392088e+01]]
```

係數 c：
```
[0.21075711 0.00029316]
```