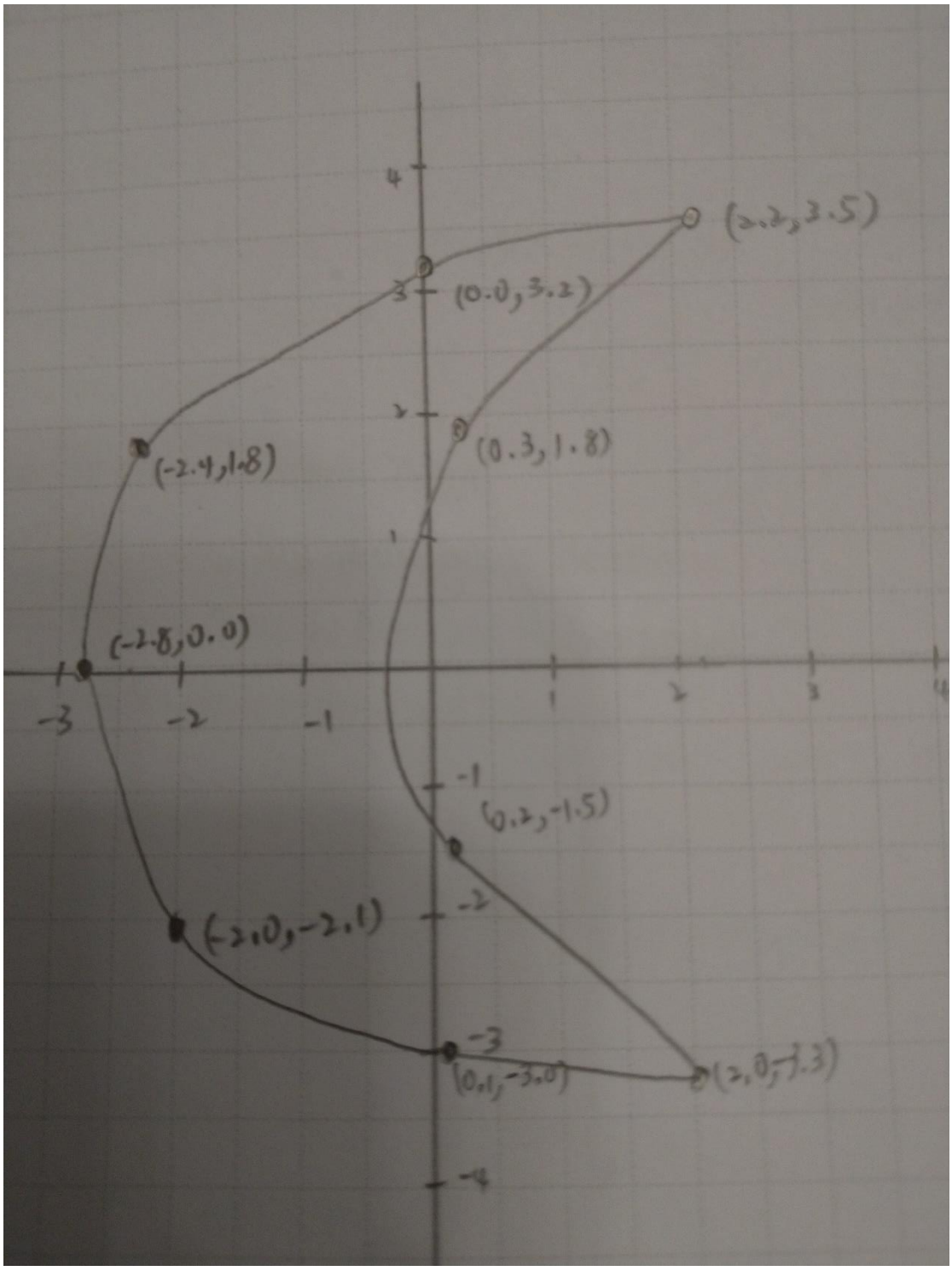
2020 Numerical Analysis Computer Project #2

00757146 許詠晴

I.



II.

Microsoft Visual Studio 偵錯主控台

```
Chord-length
T[i]    0.000000        0.102345        0.230416        0.315409
X[i]    2.200000        0.000000        -2.400000       -2.800000
Y[i]    3.500000        3.200000        1.800000        0.000000
------------------------------------------------------------------
Uniform
T[i]    00000000        00000001        00000002        00000003
X[i]    2.200000        0.000000        -2.400000       -2.800000
Y[i]    3.500000        3.200000        1.800000        0.000000
```

```
  0.418992      0.524304      0.612968      0.730304      1.000000
  -2.000000     0.100000      2.000000      0.200000      0.300000
  -2.100000     -3.000000     -3.300000     -1.500000     1.800000
------

  00000004      00000005      00000006      00000007      00000008
  -2.000000     0.100000      2.000000      0.200000      0.300000
  -2.100000     -3.000000     -3.300000     -1.500000     1.800000
```

III.

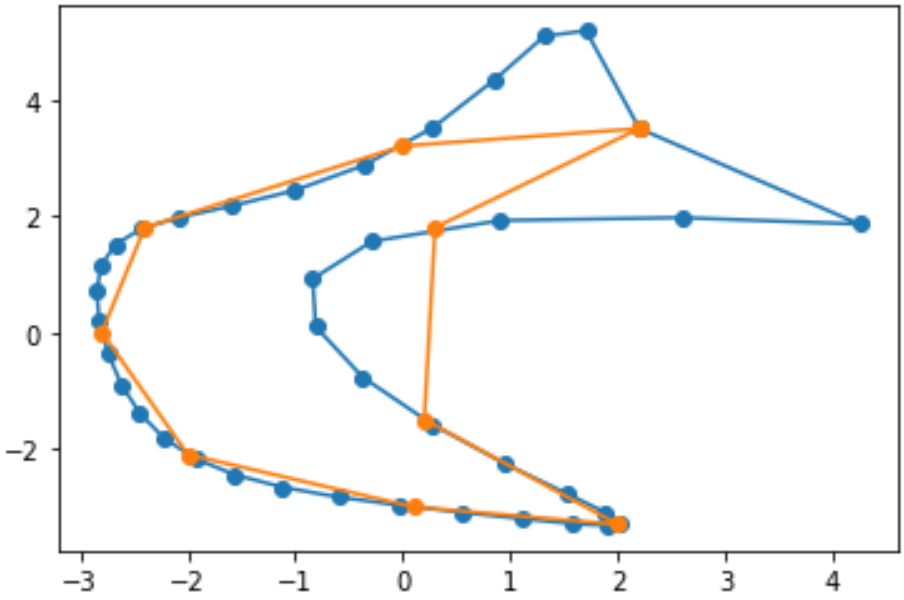
uniform : coefficients of the polynomial:

$x_i = X(t_i)$:

```
c0 = 2.200000
c1 = -2.200000
c2 = -0.100000
c3 = 0.366667
c4 = -0.125000
c5 = 0.032500
c6 = -0.008889
c7 = 0.001687
c8 = 0.000022
c9 = -0.000131
```

$y_i = Y(t_i)$:

```
c0 = 3.500000
c1 = -0.300000
c2 = -0.550000
c3 = 0.116667
c4 = -0.025000
c5 = 0.016667
c6 = -0.007639
c7 = 0.002619
c8 = -0.000727
c9 = 0.000159
```



橘色:
Sample 點

藍色:
40 個
generate
出來的點

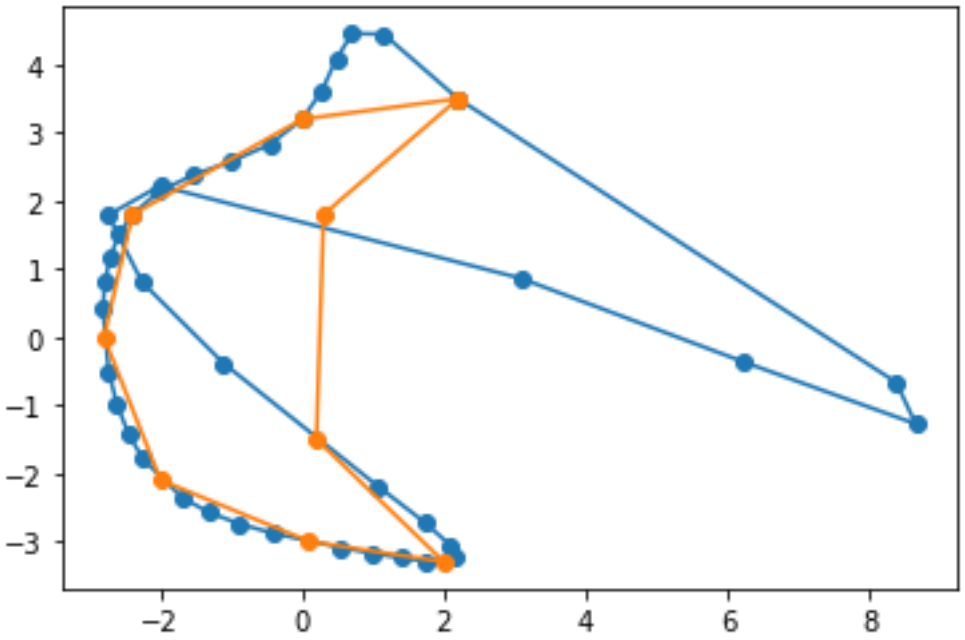
chord_lenght : coefficients of the polynomial:

$x_i = X(t_i)$:

```
c0 = 2.200000
c1 = -21.495920
c2 = 11.962518
c3 = 170.894169
c4 = -407.503631
c5 = 662.310894
c6 = -2103.093228
c7 = 1413.475534
c8 = 17589.443624
c9 = -83051.696761
```

$y_i = Y(t_i)$:

```
c0 = 3.500000
c1 = -2.931262
c2 = -34.720409
c3 = -42.396586
c4 = 499.837067
c5 = -918.651134
c6 = -847.213546
c7 = 10633.392052
c8 = -34811.078971
c9 = 79320.774786
```



橘色:
Sample 點

藍色:
40 個
generate
出來的點

IV.

A.

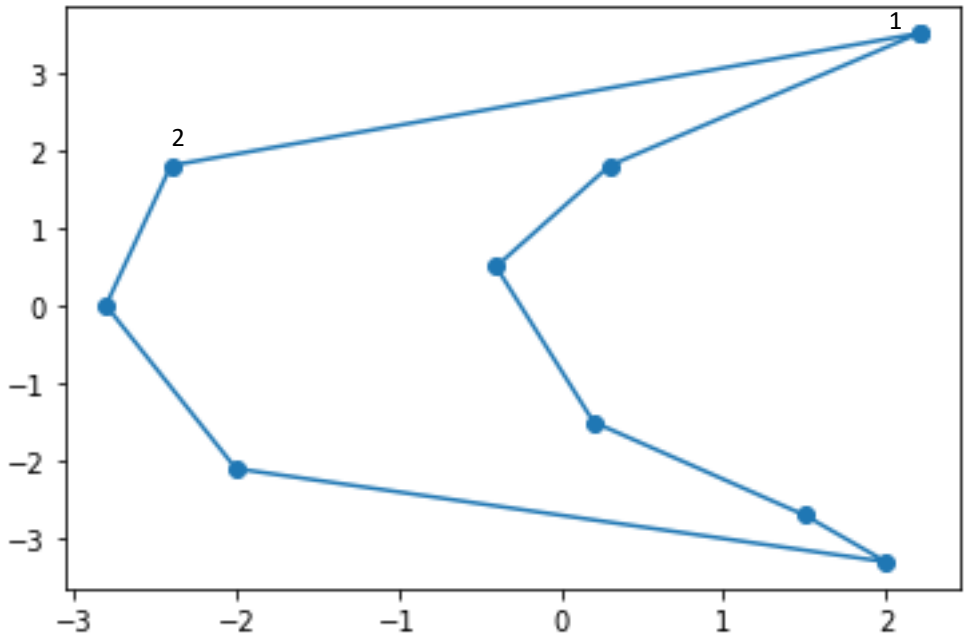
在我的嘗試下 Uniform 的結果比較好

B.

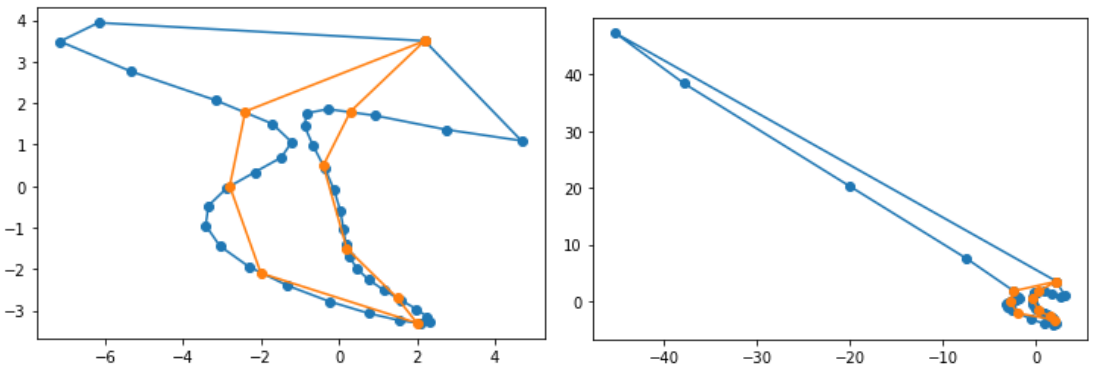
我覺得取的 sample 點會有影響。

嘗試(1):

將點 1 與點 2 距離故意拉很開

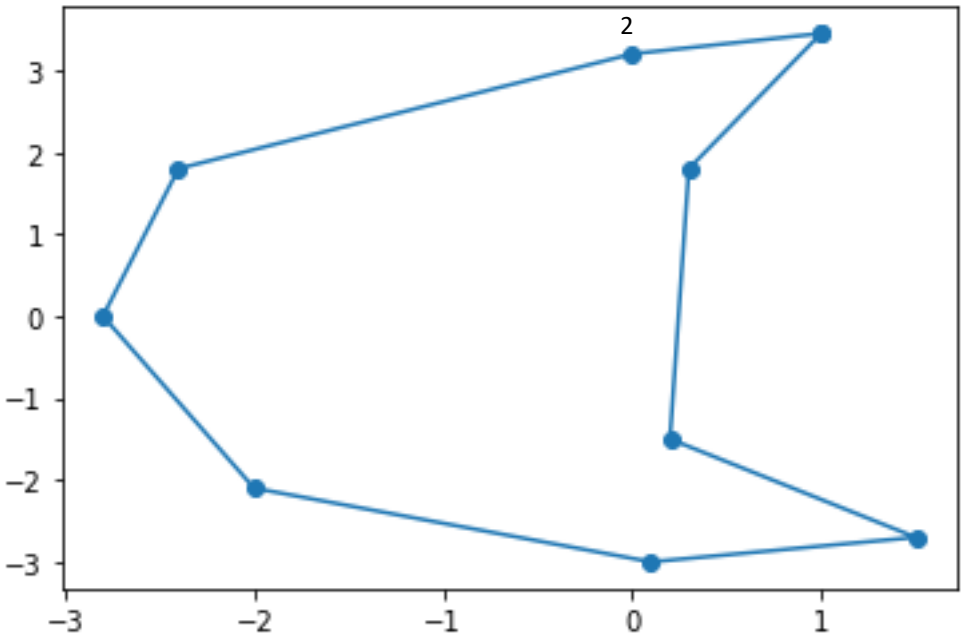


結果: 左為 uniform，又為 chord_length

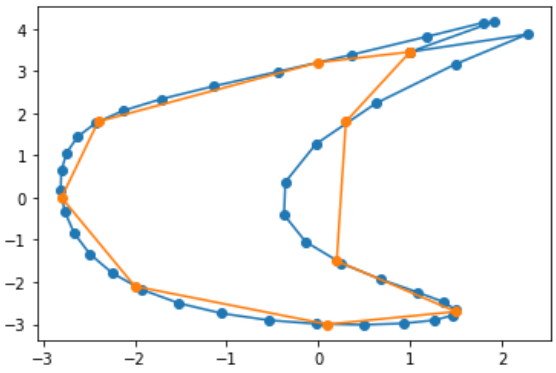


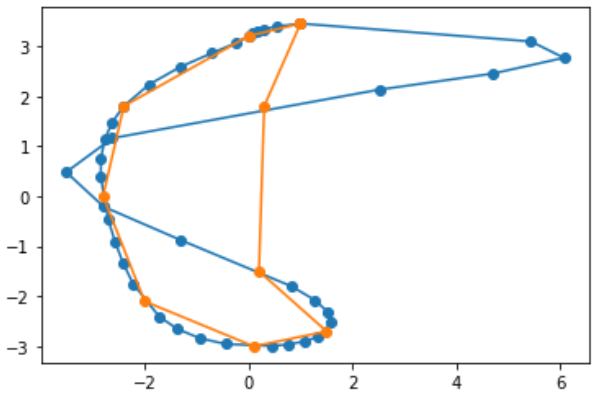
嘗試(2):

將點 1 和點 2 距離拉近



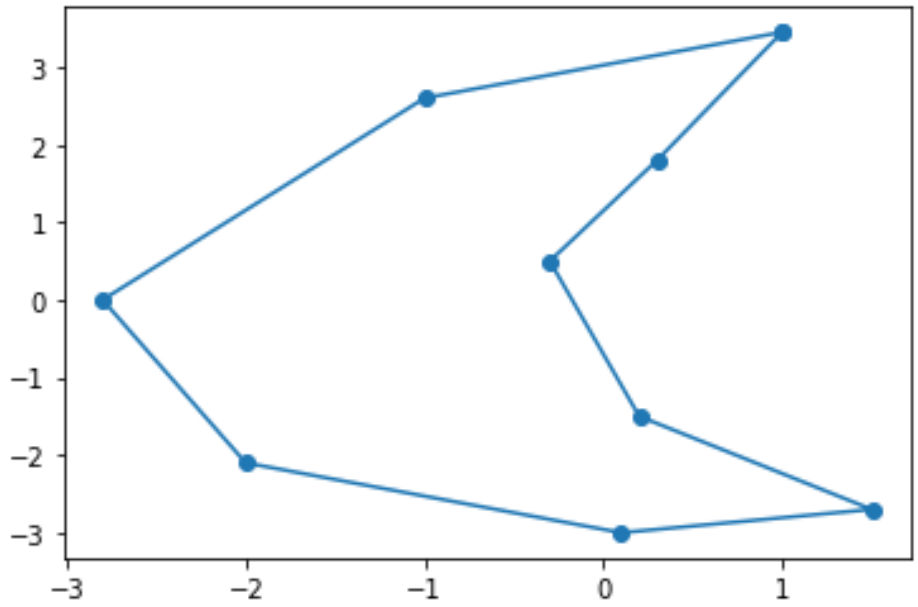
結果:　左為 uniform，右為 chord_length



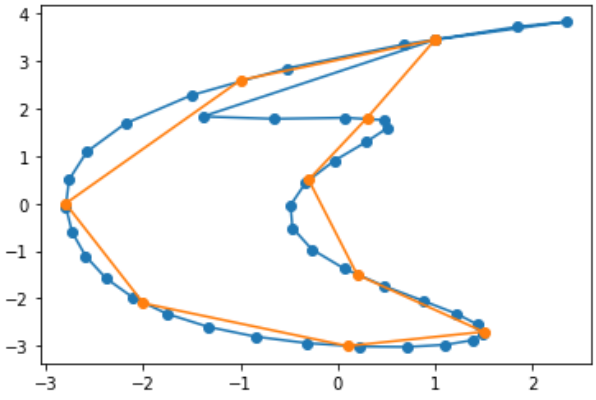


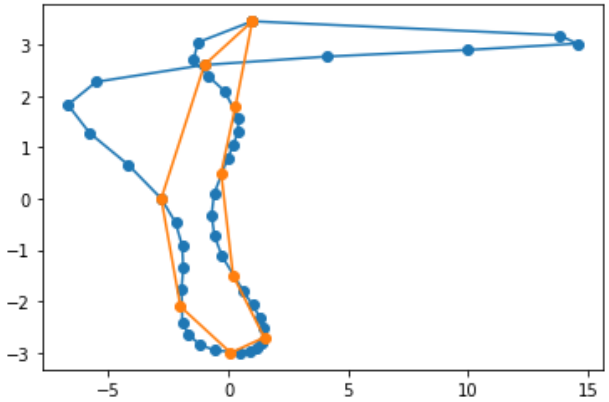
嘗試(3):

將內側多加一個 sample point，外側則減少一個



結果: 左為 uniform，右為 chord_length





結論:

基本上，感覺 sample 點越密的地方，結果會越好。