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69 lines (47 sloc) 1.31 KB

```
1 import matplotlib.pyplot as plt
2 import numpy as np
3
4 #Function
5 def func(x):
6     return 5 - x + 0.45 * x ** 2 - 0.08 ** 3 + 0.005 * x ** 4
7
8
9 #####
10 from scipy.optimize import minimize_scalar
11
12 res = minimize_scalar(func, bounds = (-20,20), method= 'bounded')
13 res.x
14 #####
15
16
17 #Generate X&Y values for plotting
18 steps = range(-100,100)
19 b = []
20 for step in steps:
21     b.append(func(step))
22
23 plt.plot(steps,b)
24
25
26 x_up = 20
27 x_lo = -20
28
29
30 golden_ratio = ((np.sqrt(5)-1)/2)
31 d = golden_ratio*(x_up-x_lo)
32 new_x_up = x_lo + d
33 new_x_lo = x_up - d
34
35 fig = plt.figure()
36
37 XLO = []
38 XHI = []
39
40 for i in range (0,100):
41     if func(new_x_lo) < func(new_x_up):
42         x_up = new_x_up
43         new_x_up = new_x_lo
44
45         d = golden_ratio*(x_up-x_lo)
46         new_x_lo = x_up-d
47         XLO.insert(0,new_x_lo)
48         print('one_', new_x_up,new_x_lo)
49     if func(new_x_lo) > func(new_x_up):
50         x_lo= new_x_lo
51         new_x_lo = new_x_up
```

```
52     d = golden_ratio*(x_up - x_lo)
53     new_x_up = x_lo + d
54     XHI.insert(0,new_x_up)
55
56     print('two_', new_x_up,new_x_lo)
57
58
59     plt.plot(x_lo,func(x_lo),'or')
60     plt.show()
61     plt.plot(x_up,func(x_up),'ob')
62     plt.show()
63
64
65     if len(XLO) and len(XHI) > 1:
66         if abs(XLO[0] - XLO[1]) and abs(XHI[0] - XHI[1]) < 0.1:
67             break
68
```