6.5.9

EE24BTECH11015 - Dhawal

Question:

Find the maximum value of the function $f(x) = \sin x + \cos x$

Solution:

$$f'(x_n) = \cos x_n - \sin x_n \tag{1}$$

Gradient ascent to find local maximum,

$$x_{n+1} = x_n + \eta f'(x_n) \tag{2}$$

$$x_{n+1} = x_n + \eta(\cos(x_n) - \sin(x_n)) \tag{3}$$

Where η is the learning rate.

Assuming,

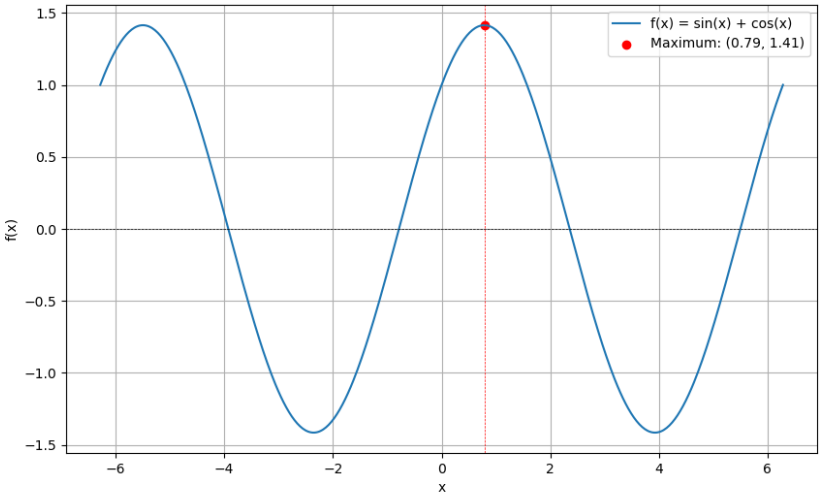
$$\eta = 0.1 \tag{4}$$

$$\text{tolerance} = 1e-6 \tag{5}$$

$$x_0 = 0.0 \tag{6}$$

We get,

$$x_{max} = 0.785392, \quad y_{max} = 1.414214 \tag{7}$$


f(x) = sin(x) + cos(x)
Maximum: (0.79, 1.41)
f(x)
x
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−6
−4
−2
0
2
4
6