AI

Assignment-3

19K41A0447

find the global min. point and value for the function $f(x,y) = 3x^2 + 5e^{-y} + 10$

Sol:- Step 1: Initialization

$x=1, y=1$, epochs $= 2$, $\eta = 0.1$

Iteration 1:

$$\frac{df}{dx} = 6x = 6$$

$$\frac{df}{dy} = -5e^{-y} = -5(0.36) = -1.8$$

$$\Delta x = -\eta \frac{df}{dx}$$

$$= -(0.1)(6)$$

$$= -0.6$$

$$\Delta y = -\eta \frac{df}{dy}$$

$$= -(0.1)(-1.8)$$

$$= 0.18$$

$$x = x + \Delta x = 1 - 0.6 = 0.4$$

$$y = y + \Delta y = 1 + 0.18 = 1.18$$

Iteration 2:

$$\frac{df}{dx} = 6x = 2.4$$

$$\frac{df}{dy} = -5e^{-y} = -5e^{-1.18} = -1.53$$

$$\Delta x = -\eta \frac{df}{dx} = -(0.1)(2.4) = -0.24$$

$$\Delta y = -\eta \frac{df}{dy} = -(0.1)(-1.53) = 0.153$$

$$x = x + \Delta x = 0.4 - 0.24 = 0.16$$

$$y = y + \Delta y = 1.18 + 0.153 = 1.33$$