

Assignment - 9

1. Let us consider a sample dataset have 1 i/p and 1 o/p and no of samples 4. Develop a simple SLR using momentum

Sample	x_i	y_i
1	0.2	3.4
2	0.4	3.8
3	0.6	4.2
4	0.8	4.6

Manual Calculations for 2 iterations with 1st 2 samples:

1. (x, y) , $m=1$, $c=-1$, $\eta=0.1$, $epochs=2$, $\beta=0.1$, $V_m = V_c = 0$, $ns=2$
2. $iter=1$
3. Sample = 1
4. $g_m = \frac{\partial E}{\partial m} = -(y_i - mx_i - c)x_i = -(3.4 - 1(0.2) + 1)0.2 = -0.84$
 $g_c = \frac{\partial E}{\partial c} = -(y_i - mx_i - c) = -(3.4 - 1(0.2) + 1) = -4.2$
5. $V_m = \beta V_m - \eta g_m = 0.1(0) - (0.1)(-0.84) = -0.084$
 $V_c = \beta V_c - \eta g_c = 0.1(0) - (0.1)(-4.2) = -0.42$
6. $m = m + V_m = 1 + (-0.084) = -0.916$
 $c = c + V_c = -1 - 0.42 = -1.42$
7. Sample = 2
8. if (sample > ns) goto step 9
 $\rightarrow 2$
 else goto step 4
9. $g_m = -(3.8 - (0.916)0.4 + 1.42)(0.4) = -1.941$

$$g_c = -4.85$$

$$5. \quad V_m = 8V_m - 7g_m = -0.26$$

$$V_c = 8V_c - 7g_c = -0.86$$

$$6. \quad m = 0.091 + (-0.26) = 0.64$$

$$c = -1.42 - 0.86 = -2.28$$

$$7. \quad \text{Sample} = 3$$

$$8. \quad \text{if (Sample} > \text{ns)} \quad \text{goto step 9}$$

$$\text{else} \\ \text{goto step 4}$$

$$9. \quad \text{iter} = 2$$

$$10. \quad \text{if (iter} > \text{maxiter)} \quad \text{goto step 4}$$

$$\text{else} \\ \text{goto step 3}$$

$$3. \quad \text{Sample} = 1$$

$$4. \quad g_m = -1.110, \quad g_c = -5.55$$

$$5. \quad V_m = 8V_m - 7g_m = -0.35$$

$$V_c = 8V_c - 7g_c = -1.33$$

$$6. \quad m = 0.64 + (-0.35) = 0.29$$

$$c = -2.28 - 1.33 = -3.61$$

$$7. \quad \text{Sample} = 2$$

$$8. \quad \text{if (Sample} > \text{ns)} \quad \text{goto step 9}$$

$$\text{else} \\ \text{goto step 4}$$

$$9. \quad g_m = -2.91, \quad g_c = -7.29$$

$$5. \quad V_m = -0.60, \quad V_c = -1.92$$

$$6. \quad m = -0.316, \quad c = -5.54$$

$$7. \quad \text{Sample} = 3$$

$$8. \quad \text{if (Sample} > \text{ns)} \quad \text{goto step 9}$$

$$\text{else} \\ \text{goto step 4}$$

9. iter = 3

10. if (iter > epochs) goto step 11

else
goto step 3

11. print m,c $m = -0.316$, $c = -5.54$