NM Lab Sheet
II Year / II Part
Faculty: Computer/Electrical

Labsheet#9

Objective

1. To Implement **Curve Fitting** by Least Square Method.

Fit the straight line: y = a + bx

Algorithm

1. Start
2. Input no. of observations
3. For i = 1 to n
   Input Xi
   Input Yi
   Next i
4. Initialize sumx = sumx2 = sumy = sumxy = 0
5. Calculate all required sum as:
6. For i = 1 to n
   sumx = sumx + Xi
   sumy = sumy + Yi
   sumx2 = sumx2 + (Xi * Xi)
   sumxy = sumxy + (Xi * Yi)
   Next i
7. Calculate the required constants as:
   b = (n * sumxy – sumx * sumy)/(n * sumx2 – sumx * sumx)
   a = (sumy – b * sumx)/n
8. Print a and b as output & display best fit equation
9. Stop

Fit the exponential model: $y = ab^x$

Algorithm

1. Start
2. Input no. of observations
3. For i = 1 to n
   Input Xi
   Input Yi
   Next i
4. Initialize sumx = sumx2 = sumY = sumxY = 0
5. Calculate all required sum as:
6. For i = 1 to n
   sumx = sumx + Xi
   sumY = sumY + log(Yi)

sumx2 = sumx2 + (Xi * Xi)
sumxY = sumxY + (Xi * log(Yi))
Next i

7. Calculate the required constants as:
   B = (n * sumxY – sumx * sumY)/(n * sumx2 – sumx * sumx)
   A = (sumY – B * sumx)/n
   b = antilog(B)
   a = antilog(A)
8. Print a and b as output & display best fit equation
9. Stop

Lab Assignment#9

1. Fit a second-degree polynomial $y = a + bx + cx^2$ to the data (0, 1), (1, 6) and (2,17).
2. Write an algorithm, pseudo-code, flowchart & program code in any high-level language to fit the
   a. Straight line $y = a + bx, where\ a, b\ \&\ c\ are\ constants$
   b. Exponential Curve $y = e^x$.
3. Fit a curve of the form $y = {}^{x}/_{(a+bx)}$ to the data: (3, 7.148), (5, 10.231), (8, 13.509), (12, 16.434).
4. Fit the saturation growth rate model to the data given below:

x	2	4	6	8
y	1.4	2	2.4	2.6

5. Fit the Gaussian Bell Curve $y = ae^{\left(-\frac{(x-b)^2}{2c^2}\right)}$ to the data:

x	2	3	4.5	8	8.2
y	0.92528	3.42482	7.48226	0.18674	0.11978

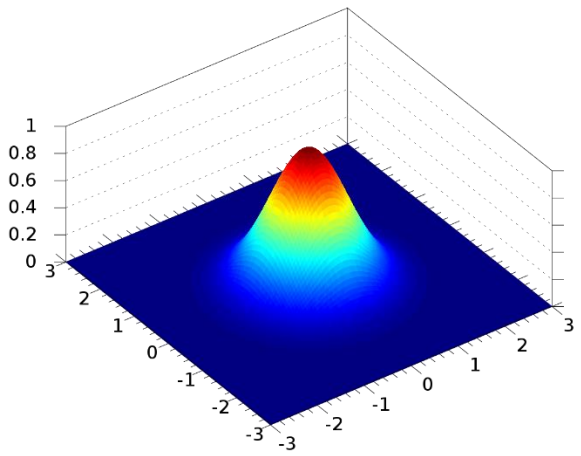

Figure 1: Gaussian curve with a two-dimensional domain