Numerical Computing Methods
Assignment (6)

First Semester 2022/2023

Grade

Name, Family Name: Essam Anwar Khalil

ID: 392024443   Section: 1105   Signature:

3. Fit a straight line approximate to the data:

x	1	2	3	4
y	3	7	13	21

The equ of straight line $\Rightarrow$ $y = a + bx$

Normal eqn $\Rightarrow$ $\Sigma y = ma + b\Sigma x$

$\Sigma xy = a\Sigma x + b\Sigma x^2$

$\boxed{m = 4}$

X	y	x^2	y^2	xy
1	3	1	9	3
2	7	4	49	14
3	13	9	169	39
4	21	16	441	84
$\Sigma x = 10$	$\Sigma y = 55$	$\Sigma x^2 = 30$		$\Sigma xy = 140$

$55 = 4a + 10b$

$140 = 10a + 30b$

$a = 11.501$

$b = 0.833$

$\Rightarrow$

the line $=$

y $11.501 + 0.833x$

9. If P is the pull required to lift a load W by means of a pulley block, find a linear law of the form P = mW + c connecting P and W, using the data:

P	12	15	21	25
W	50	70	100	120

where P and W are taken in kg-wt.

! $P = mW + c$, we need to find m, c

$\Rightarrow$ $12 = m \cdot 50 + c$ (eq1)

$\Rightarrow$ $15 = m \cdot 70 + c$ (eq2)

$15 - 12 = m(70 - 50) + c - c$

$\Rightarrow$ $\boxed{m = 3/20}$

$12 = 3/20 (50) + c$

$12 = 15/2 + c$

$\boxed{c = 9/2}$

Now we can say the linear law of this form:

$\Rightarrow$ $P = mW + c$

$\Rightarrow$ $\boxed{P = 3/20 \, W + 9/2}$ ✓

11. Differentiate between interpolating polynomial and least squares polynomial obtained for a set of data.

the interpolating polynomial will go through exactly all the set of data points, it must have a degree equal to n-1 if there are n point of data are given.

the squares polynomial can have a degree much lower than the number of points data that given.
Maybe, the polynomial not go through all the points but the points that are degree or lower, it will be closest to all the points of the data.