Islamic University Faculty of Computer and Information Systems		الجامعة الإسلامية كلية الحاسب الآلي ونظم المعلومات

Numerical Computing Methods
Assignment (7)

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Grade

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1. Find the regression line of y on x from the following data:

x:	1	2	3	4	5
y:	2	5	3	8	7

Soln: The line of regression of y on x is given by $y - \bar{y} = \frac{r\sigma_y}{\sigma_x}(x - \bar{x})$

x	y	x^2	y^2	xy
1	2	1	4	2
2	5	4	25	10
3	3	9	9	9
4	8	16	64	32
5	7	25	49	35
$\Sigma x = 15$	$\Sigma y = 25$	$\Sigma x^2 = 55$	$\Sigma y^2 = 151$	$\Sigma xy = 88$

$\bar{x} = \frac{1}{n}\Sigma x = \frac{1}{5} \times 15 = 3$

$\bar{y} = \frac{1}{n}\Sigma y = \frac{1}{5} \times 25 = 5$

$\sigma_x = \sqrt{\frac{1}{n}\Sigma x^2 - \bar{x}^2} = \sqrt{\frac{1}{5}(55) - 9}$

$\sigma_x = \sqrt{2} = 1.414$

$\sigma_y = \sqrt{\frac{1}{n}\Sigma y^2 - \bar{y}^2} = \sqrt{\frac{1}{5}(151) - 25}$

$\sigma_y = 2.280$

$r = \frac{\frac{1}{n}\Sigma xy - \bar{x}\bar{y}}{\sigma_x \sigma_y} = \frac{\frac{1}{5}(88) - 15}{(1.414)(2.280)}$

$r = 0.806$

y on x $\Rightarrow$ $y - \bar{y} = \frac{r\sigma_y}{\sigma_x}(x - \bar{x})$

$\Rightarrow y - 5 = \frac{(0.806)(2.280)}{1.414}(x - 3)$

$y - 5 = 1.299(x - 3)$

$y - 5 = 1.299x - 3.897$

$y = 1.299x - 3.897 + 5$

$y = 1.299x - 1.103$