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3000

Given $d = \alpha \beta^t$ (1)

Comparing eqn(1) to $y = m$

$$\log d = \log \alpha + t \log \beta$$

where $a_0 = \log \alpha$

$a_1 = \log \beta$

	$Y = \log d$	$t = x$	XY	$d(x)$	X^2	Y^2
1	0.301029996	0	0	0	0	0.09061905
2	0.698970004	1	0.698970004	1	1	0.48859067
3	1.278753601	2	2.557507202	2	4	1.635210772
4	1.698970008	3	5.096910013	3	9	2.886409071
5	2.178976947	4	8.715907789	4	16	4.747940537
6	2.672097858	5	13.36048929	5	25	7.140106962
7	3.1568519091	6	18.9411143	6	36	9.965713925
8	3.654361091	7	25.58058364	7	49	13.35441345
9	4.111800007	8	32.89440006	8	64	16.9068195
10	4.614163911	9	41.5869537	9	81	21.28497336
11	5.045405135	10	50.45405135	10	100	25.45611297

$$\Sigma y = 29.41132046$$

$$\Sigma x = 55$$

$$\Sigma xy = 199.8268839$$

$$\Sigma x^2 = 385$$

$$\Sigma y^2 = 103.9620485$$

$$\Sigma y = a_0 n + a_1 \Sigma x$$

$$29.41132046 = a_0 (11) + a_1 (55) \quad (1)$$

(2)

$$E_{xy} = a_0 E_2 + 4.9x^2$$

$$199.8268839 = a_0(55) + a_1(385) \dots (i)$$

Solving eqn (i) & (ii)

$$29.41133046 = 11a_0 + 55a_1$$

$$199.8268839 = 55a_0 + 385a_1$$

$$a_0 = \begin{vmatrix} 29.41133046 & 55 \\ 199.8268839 & 385 \end{vmatrix} \\ \hline \begin{vmatrix} 11 & 55 \\ 55 & 385 \end{vmatrix}$$

$$\frac{(29.41133046)(385) - (55)(199.8268839)}{(11 \times 385) - (55 \times 55)}$$

$$a_0 = 0.27511$$

$$a_1 = \begin{vmatrix} 11 & 29.41133046 \\ 55 & 199.8268839 \end{vmatrix} \\ \hline \begin{vmatrix} 11 & 55 \\ 55 & 385 \end{vmatrix}$$

$$a_1 = \frac{(11 \times 199.8268839) - (29.41133046 \times 55)}{(11 \times 385) - (55 \times 55)}$$

$$a_1 = 0.47973$$

$$a_0 = \log \alpha$$

$$0.27511 = \log \alpha$$

$$\alpha = 1.884$$

$$a_1 = \log \beta$$

$$0.47973 = \log \beta$$

$$\beta = 3.0181$$

$$f = 1.8841$$

$$\beta = 3.0181$$

Correlation Co-efficient

$$R = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{[N \sum x^2 - (\sum x)^2][N \sum y^2 - (\sum y)^2]}}$$

$$R = \frac{(11 \times 199.8268839)(55)(29.41133046)}{\sqrt{[11 \times 388 - 55^2] \times [11 \times 103.9620483 - (29.41187846)^2]}}$$

$$R = 0.9998448312$$

$$R_{\text{square}} = (0.9998448312)^2$$

$$= 0.9996896864$$

For manual method

$$R = 0.9998448312$$

$$R^2 = 0.9996896862$$

From mat lab

$$R = 0.9998$$

$$R^2 = 0.9997$$

For Excel

$$R = 0.99984483235763$$

$$R^2 = 0.999689688792257$$

From observation for all the methods used to solve the Correlation Coefficient and its square; it can be seen that $R^2 < R$ (i.e. the value of the square of the Correlation Coefficient is lesser than the actual value of the Correlation Co-efficient)