Semester : 4 Subject : Statistics for AIDS Academic Year: 2023 - 2024.

CORRELATION COEFFICIENT :-

$r = +1$

$X \uparrow \; Y \uparrow$.

(Positive Correlation)

$r = -1$.

$X \uparrow \; Y \downarrow$.

(Negative Correlation).

Example :-

Find the correlation coefficient for the following:

X	1	2	3	4	5	6
Y	2	4	7	9	12	14

X	Y	XY	X^2	Y^2
1	2	2	1	4
2	4	8	4	16
3	7	21	9	49
4	9	36	16	81
5	12	60	25	144
6	14	84	36	196.
Σ = 21	48	211	91	4980.
ΣX	ΣY	ΣXY	ΣX^2	ΣY^2

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$$r = \frac{n\Sigma xy - \Sigma x \Sigma y}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2}}$$

$$r = \frac{6(211) - (21)(48)}{\sqrt{[6(91) - (21)^2][6(490) - (48)^2]}}$$

$$= \frac{1266 - 1008}{\sqrt{[546 - 441][2940 - 2304}}$$

$$= \frac{258}{\sqrt{(105)(638)}}$$

$$\boxed{r = 0.998}$$

Since r is positive. X and Y are positively correlated.