Probability & Statistics

L-15.

Make up Mid Sem - March 22
6-8 pm
Dept. of Maths.
N325

Class Test — April 8
(20 marks)
5-6:30 pm
Nalanda, email

- Assignment-4 & the upcoming Assignments are important for the class test.
- Syllabus: after mid sem.

$$\text{Cov}(X,Y) = \sum_j \sum_i (x_i - E(X))(y_j - E(Y)) \underbrace{p_{ij}}_{P(X=x_i, Y=y_j)}$$

$$\text{Cov}(X,Y) = \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} (x - E(X))(y - E(Y)) \, p_{(X,Y)}(x,y) \, dx\, dy$$

↙ to define a degree of dependence of two random variables.

If $\mathrm{Cov}(X,Y) = 0$ in the weaker sense / version of independence of X & Y

Def. If $\mathrm{Cov}(X,Y) = 0$ then we say that X & Y are **uncorrelated**.

If $\mathrm{Cov}(X,Y) \neq 0$ then X & Y are **correlated**.

Q. " $\mathrm{Cov}(aX,Y) = a\,\mathrm{Cov}(X,Y)$

Thus $\mathrm{Cov}(X,Y)$ is not a good idea to interpret it as a concept for degree of dependence.

Correlation coefficient:
Let X & Y with finite second moments. Assume that neither X and Y are constants with prob. 1. i.e. $V(X) > 0$, $V(Y) > 0$

$$\rho(X,Y) = \frac{\mathrm{Cov}(X,Y)}{\sqrt{V(X)}\sqrt{V(Y)}}$$

i.e. $-1 \leq \rho(X,Y) \leq 1$. (H.W.)