Esercizio 3

lunedì 24 maggio 2021 18:39

$X = (X_1, X_2)$

X_2 \ X_1	2	4	6
1	0.14	0.28	0.28
3	0.06	0.12	0.12

$P(X_1 = 2) = 0.14 + 0.6 = 0.20$

$P(X_1 = 4) = 0.28 + 0.12 = 0.40$

$P(X_1 = 6) = 0.28 + 0.12 = 0.40$

$P(X_2 = 1) = 0.14 + 0.28 + 0.28 = 0.70$

$P(X_2 = 3) = 0.12 + 0.12 + 0.6 = 0.30$

Media

$E(X_1) = 2 \cdot 0.20 + 4 \cdot 0.40 + 6 \cdot 0.40$

$= 0.40 + 1.60 + 2.40$

$= 4.40$

$E(X_2) = 1 \cdot 0.70 + 3 \cdot 0.30$

$= 0.70 + 0.90$

$= 1.60$

$$E(X_1^2) = 2^2\ 0.20 + 4^2 \cdot 0.40 + 6^2\ 0.40$$

$$= 0.80 + 6.40 + 14.40$$

$$= 21.6$$

$$E(X_2^2) = 1^2 \cdot 0.70 + 3^2 \cdot 0.30$$

$$= 0.70 + 2.70$$

$$= 3.40$$

VARIANZA

$$VAR(X) = E(X)^2 - (EX)^2$$

$$VAR(X_1) = 21.6 - (4.40)^2$$

$$= 21.6 - 19.36$$

$$= 2.24$$

$$VAR(X_2) = 3.40 - (1.60)^2$$

$$= 3.40 - 2.56$$

$$= 0.84$$

Sono indipendenti

$P(X_1 = 2)\ P(X_2 = 1) = 0.20 \cdot 0.70 = 0.14$ Vero

$P(X_1 = 4)\ P(X_2 = 1) = 0.40 \cdot 0.70 = 0.28$ Vero

$P(X_1 = 6)\ P(X_2 = 1) = 0.40 \cdot 0.70 = 0.28$ Vero

$P(X_1 = 2)\ P(X_2 = 3) = 0.20 \cdot 0.30 = 0.06$ Vero

$P(X_1 = 4)\ P(X_2 = 3) = 0.40 \quad 0.30 = 0.12$ Vero

$P(X_1 = 6)\ P(X_2 = 3) = 0.40 \quad 0.30 = 0.12$ Vero

Sono indipendenti

indipendenti → COVARIANZA = 0

$$Cov(X_1, X_2) = 0$$

$$Cov = E(x_1, x_2) - [E(x_1) \cdot E(x_2)]$$

$$E(x_1, x_2) : \quad x_1 \cdot x_2 \cdot (x_1, x_2)$$

$$\rho(X_1, X_2) = \frac{Cov(X_1, X_2)}{\sqrt{Var(X_1) \cdot Var(X_2)}}$$

$$= \frac{0}{\sqrt{2.24 \cdot 0.84}} = 0$$

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$y \quad X_2 - X_1$

$P(y) = \quad p(-1) = 0.14 + 0.12 = 0.26$

$p(-3) = 0.28 + 0.12 = 0.40$

$p(-5) = 0.28 \qquad = 0.28$

$p(1) = 0.06 \qquad = 0.06$

$$y = x_1 - \lambda c$$

$$P(y) = p(x) = 0.14 + 0.12 = 0.26$$

$$p(3) = 0.28 + 0.12 = 0.40$$

$$p(5) = 0.28 = 0.28$$

$$p(-1) = 0.06 = 0.06$$