Israel
Nolazco

Week 3 Assignment #

1) Probability distribution $f(z)$.

$f(-2) = 0.3$

$f(3) = 0.2$

$f(5) = 0.5$

(compute $E(z)$, $Var(z)$ & Standard deviation z

$E(z) \Rightarrow (-2)(0.3) + (3)(.2) + (5)(.5) = 2.5$

$E(z) = 2.5$

$Var(z) = (-2-2.5)^2(0.3) + (3-2.5)^2(0.2) + (5-2.5)^2(0.5) =$

$Var(z) = (6.075) + (0.05) + (3.125)$

$Var(z) = 9.25$

$\sigma_z = \sqrt{9.25} = 3.04$

2) Fair dice, equal probability

1	1/6
2	1/6
3	1/6
4	1/6
5	1/6
6	1/6

(compute $E(X)$ $Var(X)$

$$E(X) = (1)(1/6) + (2)(1/6) + (3)(1/6) + (4)(1/6) + (5)(1/6) + (6)(1/6)$$

$$E(X) = 3.5$$

$$Var(X) = (1-3.5)^2(1/6) + (2-3.5)^2(1/6) + (3-3.5)^2(1/6) + (4-3.5)^2(1/6) + (5-3.5)^2(1/6) + (6-3.5)^2(1/6) =$$

$$Var(X) = 2.9$$

3) $X = 0$ $P(X=0)$ 0.4
$X = 1$ $P(X=1)$ 0.4
$X = 2$ $P(X=2) = 0.2$

- Team plays 2 games
- # homeruns is independent in the other game

let Y = # of homeruns

Find E_Y & $Var(Y)$

$$Y = X_1 + X_2$$

$E(Y) = 2E(X)$ & $Var(Y) = 2\ Var(X)$

$$E(Y) = 2\left[(0)(0.4) + (1)(0.4) + (2)(0.2)\right]$$

$$E(Y) = 2[0.8] \Rightarrow 1.6$$

$$Var(Y) = 2\left[(0-1.6)^2(0.4) + (1-1.6)^2(0.4) + (2-1.6)^2(0.2)\right]$$

$$Var(Y) = 1.2$$

4)

X \ Z	-2	3	5	
1	1/6	0	0	1/6
2	2/15	1/30	0	1/6
3	0	1/6	0	1/6
4	0	0	1/6	1/6
5	0	0	1/6	1/6
6	0	0	1/6	1/6

Compute covariance X & Z

Comput correlation coefficient X & Z

$\mu_X = (1)(1/6) + (2)(1/6) + (3)(1/6) + 4(1/6) + 5(1/6) + 6(1/6)$

$\mu_X = 3.5$

* from problem 1

$\mu_Z = E(Z) = 2.5$

$E(XZ) = \sum\sum XZ \cdot f(X,Z)$

* Note: Because some points are zero there are multiple point where we are adding zero therefore I'll just no write them ex. $(1)(3)(0) = 0$ not that important

4 cont)

$$(1)(-2)(1/6) + (2)(-2)(2/15) + (2)(3)(1/30) + (3)(3)(1/6) + (4)(5)(1/6) + (5)(5)(1/6) + (6)(5)(1/6) =$$

$$E(XZ) = 13.33$$

$$\sigma_{(XZ)} = 13.33 - (3.5)(2.5) = 4.58$$

$$\rho_{(XZ)} = \frac{\sigma_{XZ}}{\sigma_X \sigma_Z} = \frac{4.58}{\sigma_X \sigma_Z}$$

$$\sigma_Z = 3.04$$

Note: Because X is very similar to problem #2 where $X(1) = 1/6$, $X(2) = 1/6$, $X(3) = 1/6$... and so on

$$Var(X) = 2.9 \quad \sigma_X = \sqrt{2.9} = 1.70$$

$$\rho_{(XZ)} = \frac{4.58}{(1.70)(3.04)} = 0.89$$