

HW 2

Problem 1 (4.24) Suppose X_1, \dots, X_n are jointly distributed **discrete** RVs with expectations $E(X_i)$. Suppose Y is a linear function of the X_i so that $Y = a + b \sum_{i=1}^n b_i X_i$. For $n = 2$, prove that

$$E(Y) = a + \sum_{i=1}^n b_i E(X_i).$$

Problem 2 (4.33) Prove Chebyshev's inequality for discrete RVs.

Problem 3 (4.63) As in HW 1 # 1, let X and Y have the joint density

$$f(x, y) = \frac{6}{7}(x + y)^2 \mathbb{I}\{0 \leq x \leq 1\} \mathbb{I}\{0 \leq y \leq 1\}.$$

- (a) Find the covariance of X and Y .
- (b) Find $E(Y | X = x)$ for $x \in [0, 1]$.