

Stat 134: Covariance Review

Adam Lucas

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Conceptual Review

- a. What is the computational formula for $\text{Var}(\sum_{i=1}^n X_i)$?
- b. If X, Y are standard bivariate normal with correlation ρ , where $Y = \rho X + \sqrt{1 - \rho^2}Z$, what is the conditional distribution of Y given $X = x$? What about the conditional distribution of X given $Y = y$?

Problem 1

Let T_1 and T_3 be the times of the first and third arrivals for a Poisson process with rate λ . Find $\text{Corr}(T_1, T_3)$.

Problem 2

Toss p -coin infinitely many times. Let W_r refer to the number of trials until the r -th head. Find $\text{Corr}(W_1, W_r)$.

Problem 3

Calculate the expected value of $\max(X, Y)$ if X and Y are standard bivariate normal with correlation ρ .

Ex 6.6.18 in Pitman's Probability