

Assignment 7

(Deadline: 10/23/2009)

1. (4.30) Find $E[1/(X + 1)]$, where X is a Poisson random variable.
2. (Ex4.32) Let X have a gamma distribution with parameters α and λ . For those values of α and λ for which it is defined, find $E(1/X)$.
3. (Ex4.44) If X and Y are independent random variables with equal variances, find $\text{Cov}(X + Y, X - Y)$.
4. (Ex4.46) If $U = a + bX$ and $V = c + dY$, show that $|\rho_{UV}| = |\rho_{XY}|$.
5. (Ex4.54) Let X , Y , and Z be uncorrelated random variables with variances σ_X^2 , σ_Y^2 , σ_Z^2 , respectively. Let $U = Z + X$ and $V = Z + Y$. Find $\text{Cov}(U, V)$ and ρ_{UV} .
6. (EX4.59) Let (X, Y) be a random point uniformly distributed on a unit disk. Show that $\text{Cov}(X, Y) = 0$, but that X and Y are not independent.