

Quantitative Method

Assignment 6

Due November 15, 2005

1. Suppose that Z is a standard normal random variable and that Y_1 and Y_2 are χ^2 distributed random variables with ν_1 and ν_2 degrees of freedom, respectively. Further, assume that Z , Y_1 , and Y_2 are mutually independent.
 - (a) Suppose that X has a gamma distribution with parameter α and θ , $X \sim \text{Gamma}(\alpha, \theta)$.
Show that $E(X^k) = \frac{\theta^k \Gamma(\alpha + k)}{\Gamma(\alpha)}$ for $(\alpha + k) > 0$.
 - (b) Define $T = \frac{Z}{\sqrt{Y_1/\nu_1}}$. Find $E(T)$ and $\text{Var}(T)$.
[Hint: $T = Z(1/\sqrt{Y_1/\nu_1}) = g(Z)h(Y_1)$]
 - (c) Define $F = \frac{Y_1/\nu_1}{Y_2/\nu_2}$. Find $E(F)$ and $\text{Var}(F)$. Use the hint from (b).
2. Problem 2.2 on Page 62.
3. Problem 2.8 on Page 64.
4. Problem 2.9 on Page 64.