Quantitative Method

Assignment 7

Due December 5, 2006

1. Suppose that *X* has an exponential distribution,

$$f(x) = \theta \exp\{-\theta x\}, \quad x \geq 0$$

(a) Find the mean, variance, skewness, and kurtosis of *x*.

(b) What is the probability distribution of the random variable $y = e^{-x}$? What is E[y]? Prove that the distribution of this y is a special case of the beta distribution.

2. Given the following joint probability distribution

		X		
		0	**1**	**2**
Y	**0**	0.05	0.1	0.03
	1	0.21	0.11	0.19
	2	0.08	0.15	0.08

(a) Compute the following probabilities:
Prob(Y<2) Prob(Y<2, X>0) Prob(Y=1, X≧1)

(b) Find the marginal distributions of X and Y

(c) Calculate E[x], E[Y], Var [Y], Cov[X, Y], and E [X^2Y^3].

(d) Calculate Cov [Y, X^2].

(e) What is the conditional distribution of Y given X=2? What is the conditional distribution of X given Y > 0?

(f) Find $E[Y|X]$ and Var[Y| X]. Obtain the two parts of the variance decomposition

$$\text{Var}[Y]=E_x[\text{Var}_Y[Y|X]]+\text{Var}_x[E_Y[Y|X]].$$

3. Text problem C.1 at page 738 (Wooldridge).

4. Text problem C.7 at page 740 (Wooldridge).