STA 623 — Fall 2011 — Dr. Charnigo

Written Assignment 4

Written Assignment 4 is due on Tuesday 15 November at the end of class. You are encouraged to work in groups of two or three, but you may work individually if you prefer.

[60] 1. Let X and Y have joint probability mass function $f_{X,Y}(x,y) := p^2(1-p)^{y-2}1_{\{x<y\}}$ for positive integers x and y and $p \in (0,1)$.

[10] a. Find the marginal probability mass function of Y.

[10] b. Find the marginal probability mass function of X.

[10] c. Find the conditional probability mass function of Y given that $X = x$, a positive integer.

[10] d. Are X and Y independent?

[10] e. Find the conditional probability mass function of $Z := Y - X$ given that $X = x$, a positive integer.

[10] f. Are Z and X independent?

[40] 2. Let X and Y have joint probability density function $f_{X,Y}(x,y) := 6y1_{\{1>x>y>0\}}$.

[10] a. Find the marginal probability density function of Y.

[10] b. Find the marginal probability density function of X.

[10] c. Find the conditional probability density function of Y given that $X = x \in (0,1)$.

[10] d. Are X and Y independent?