Kyle Knudson

10/12/17

**Project 2**

X and Y are two independent and identically distributed continuous random variables. The probability density function of X is:

Fx (x) = 3x^2, 0 <= x < = 1

0, Otherwise.

That of Y is similarly defined. Write down the joint probability density function of X and Y and find the probability that Prob (Y-X >= ½).

F(x,y) = 9x^2y^2, if 0<x<1 and 0<y<1

0 , otherwise.

Use computer to generate samples (xi, yi) of n = 5000 pairs. Outer loop: N from 20 to 5000.

Inner loop: counter

Plot P\_n vs N. (scat plot)

Probability( Y-x> 1/2 ) = # of pairs satisfying y-x >1/2 )

N

(Beta distribution)

Gamma (n-1)!

F(x) = 3x^2

Alpha = 3

Beta = 1

Well known distribution:

?rbeta

Code:

x= rbeta(1000, 3,1)

y = rbeta(1000,3,1)

x

hist(x, freq = FALSE)

theoretical probability: 0.03828125