EE126:Probability and Random Process **Week 8**

Problem1. A random variable X has pdf $f_X(x) = cx(1-x), 0 \leq x \leq 1$.

a. Find c.

b. Find the pdf of the area covered by a disc with radius X.

c. Find the pdf of $Y = X^n$.

Problem2. Generation of random variables.

a. Generate random variable Y, pdf $f_Y(y) = \frac{a}{\pi(a^2+y^2)}, \infty \leq x \leq \infty, a > 0$,given random variable X,$X \sim U[0,1]$ uniformly distributed in $[0,1]$.

b. Generate random variable Y, pdf $f_Y(y) = \frac{a}{2}e^{-a|y|}, \infty \leq x \leq \infty, a > 0$, given random variable generator which generates iid random variables X, pdf $f_X(x) = be^{-bx}, x \geq 0, b > 0$.

Problem3. pdf of the sum of the square of Gaussian random variables. X, Y are independent Gaussian random variables, $X \sim N(0,1)$,$Y \sim N(0,1)$. Let $Z = X^2 + Y^2$.

a. Find the pdf of Z.

b. Find the mean and variance of Z.

c. Find the pdf of $W = \sqrt{Z}$.