UC Berkeley
Department of Electrical Engineering and Computer Sciences

EE126: Probability and Random Processes

Discussion 3
Spring 2016

Date: Wednesday, February 3, 2016

Problem 1. A point is chosen at random (according to a uniform PDF) within a semicircle of the form $\{(x, y)|x^2 + y^2 \leq r^2, y \geq 0\}$ for some $r > 0$.

(a) Find the joint PDF of the coordinates X and Y of the chosen point.

(b) Find the marginal PDF of Y and use it to find $E[Y]$

Problem 2. (Midterm 1 Spring 2015)

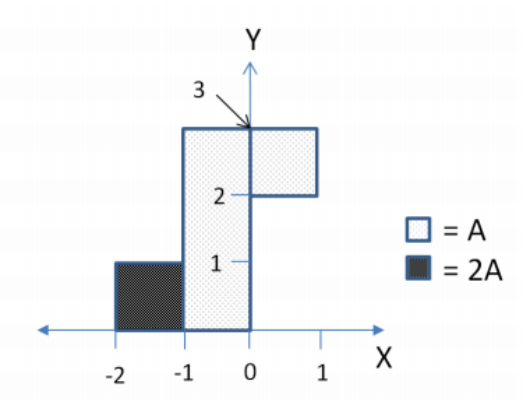

Figure 1: Joint pdf of X and Y.

(a) Find A.

(b) Find $cov(X, Y)$.

Problem 3. Let $X_1, X_2, \ldots, X_n$ be IID continuous random variables distributed uniformly on $[0, 1]$.

(a) Find $E[X_i]$ and $\text{Var}(X_i)$

(b) Let $X_{(1)}, X_{(2)}, \ldots, X_{(n)}$ be the ordered random variables such that $X_{(1)} \leq X_{(2)} \leq \cdots \leq X_{(n)}$. Find the distributions of $X_{(1)}$ and $X_{(n)}$.

(c) Find $E[X_{(1)}]$ and $E[X_{(n)}]$.