ENGR 0020 PROB & STAT FOR ENGINEERS I

Recitation Week 4

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Office Hour: Thursday 2:00 – 3:00pm, 1023 Benedum Hall

Goals:

1. To help to understand the lecture and homework questions.
2. To take quizzes for getting the feedback of the class. The quizzes will take 10 mins at the end of recitation.

1. **(Expectation Computation)** A continuous random variable X has the density function
$$f(x) = \begin{cases} e^{-x}, & x \geq 0, \\ 0, & \text{elsewhere.} \end{cases}$$
Find the expected value of $g(X) = X^2$.

2. **(Expectation Computation)** Assume that two random variables (X, Y) are uniformly distributed on a circle with radius a. Then the joint probability density function is:
$$f(x, y) = \begin{cases} \frac{1}{2a^2}, & |x| + |y| \leq a, \\ 0, & \text{otherwise.} \end{cases}$$
Find μ_X, the expected of X.

3. **(Variance Computation)** The random variable X, representing the number of errors per 100 lines of software code, has the following probability distribution:

x	2	3	4	5	6
$f(x)$	0.01	0.25	0.4	0.3	0.04

Find the variance of X.

4. **(Correlation coefficient)**Given a random variable X, with standard deviation σ_X, and a random variable $Y = a + bX$, show that if $b < 0$, the correlation coefficient $\rho_{XY} = -1$, and if $b > 0$, $\rho_{XY} = 1$.