

MTL108: Problem Set-7

IIT Delhi

IPSES refers to INTRODUCTION TO PROBABILITY AND STATISTICS FOR ENGINEERS AND SCIENTISTS book, by Ross.

Problem 1 In a circuit, the voltages across two resistors are independent random variables, X and Y . The MGF of X is $M_X(t) = (1 - 2t)^{-1}$ and the MGF of Y is $M_Y(t) = (1 - 4t)^{-1}$.

- (a) What are the distributions of X and Y ?
- (b) Find the MGF of the total voltage $Z = X + Y$.
- (c) Use the MGF of Z to find the expected total voltage, $E[Z]$, and the variance of the total voltage, $\text{Var}(Z)$.
- (d) An engineer is concerned with the total voltage. What is the distribution of the total voltage Z ?
- (e) Obtain mean, variance, measure of skewness, and kurtosis for the distribution of Z .

Problem 2 Obtain expressions for median, mode, measure of skewness, and kurtosis for the following distributions:

Bernoulli, Binomial, Poisson, Geometric, Negative Binomial, Uniform discrete, Uniform continuous, Exponential, Normal.

Problem 3 In IPSES, pages 41–51
Problems 1–37.

Reading Assignment:

In IPSES
Chapter 2