

UNIVERSITY OF PITTSBURGH  
Department of Electrical and Computer Engineering  
ECE 2521 Analysis of Stochastic Processes  
**Problem Set 3      (Fall 2020)**

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Assigned:      Sept 14  
Due:            Sept 23  
References:    Secs. 3.1, 3.2, 3.3, 3.4 and 3.5 (Leon-Garcia )

**Problem 3.1 :** Text problem 3.2 (page 130).

**Problem 3.2 :** Text problem 3.9 (page 131).

**Problem 3.3 :** Text problem 3.12 (page 131).

**Problem 3.4 :** Text problem 3.17 (page 132).

**Problem 3.5 :** Text problem 3.28 (page 133).

**Problem 3.6 :** Text problem 3.31 (page 133).

**Problem 3.7 :** Text problem 3.42 (page 134 ).

**Problem 3.8 :** Text problem 3.46 (page 134 ).

**Problem 3.9 :** Text problem 3.57 (page 136 ).

**Problem 3.10:** Text problem 3.91 (page 139).

**Problem 3.11:** Write a MATLAB script to produce a random variable which follows a Binomial distribution for arbitrary parameters  $n$ , and  $p$  with  $n$  as the number of the trials and  $p$  as the probability of observing a head in one coin toss. Estimate the probability mass function (PMF) of this random variable using relative frequency approach and compare it with the actual PMF by plotting the estimated and actual PMFs for  $n = 10$  and  $p = 0.3$ . Submit a printout of your script together with the comparison plot. (Hint: Use the MATLAB function `nchoosek` ( $n,k$ ) to compute the binomial coefficients in the actual PMF.)