Assignment 5 (AI1110)

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Outline

Question(Papoulis chap 9 Ex 9-4):

- Given n particles and $m > n$ boxes. we place at random each particle in one of the boxes. We wish to find the probability p that in n pre selected boxes, one and only one particle will be found.

Solution:

1. If we accept as outcomes all possible ways of placing n particles in m boxes distinguishing the identity of each particle, then

$$p = \frac{n!}{m^n} \tag{1}$$

2. If we assume that the particles are not distinguishable, that is, if all their permutations count as one, then

$$p = \frac{(m-1)!(n)!}{(m+n-1)!} \tag{2}$$

3. If we do not distinguish between the particles and also we assume that in each box we are allowed to place at most one particle, then

$$p = \frac{(n)!(m-n)!}{m!} \tag{3}$$