

# AI5002 - Assignment 5

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Download code and LaTeX from below hyperlinks

1. [Codes/MiscellaneousDistributions\\_5\\_31.py](#)
2. [LaTeX](#)

$$= \frac{34}{221} \approx 0.154$$

$$E(X^2) = \sum X^2 \cdot P(X)$$

$$= 0^2 * \frac{188}{221} + 1^2 * \frac{32}{221} + 2^2 * \frac{1}{221} = \frac{36}{221}$$

## Problem 5.31

Two cards are drawn simultaneously (or successively without replacement) from a well shuffled pack of 52 cards. Find the mean, variance and standard deviation of the number of kings.

The Variance calculated as  $\text{Var}(X)$  is given by,

## Solution

Let  $X$  be a random variable.

$X$  = Number of kings present in the two cards drawn from a well shuffled pack of 52 cards.

The values that  $X$  can have are  $= \{ 0, 1, 2 \}$ .

The probability of  $X$  taking each of the above values are -

The Standard-Deviation calculated as  $\text{SD}(X)$  is given by,

$$P(X = 0) = \frac{\binom{48}{2}}{\binom{52}{2}} = \frac{188}{221} \approx 0.851 \quad (0.0.1)$$

$$P(X = 1) = \frac{\binom{4}{1} * \binom{48}{1}}{\binom{52}{2}} = \frac{32}{221} \approx 0.145 \quad (0.0.2)$$

$$P(X = 2) = \frac{\binom{4}{2}}{\binom{52}{2}} = \frac{1}{221} \approx 0.004 \quad (0.0.3)$$

$$\text{SD}(X) = \sqrt{\text{Var}(X)} = \sqrt{0.139} \approx 0.373 \quad (0.0.6)$$

The Mean calculated as  $E(X)$  is given by,

$$E(X) = \sum X \cdot P(X) \quad (0.0.4)$$

$$= 0 * \frac{188}{221} + 1 * \frac{32}{221} + 2 * \frac{1}{221}$$

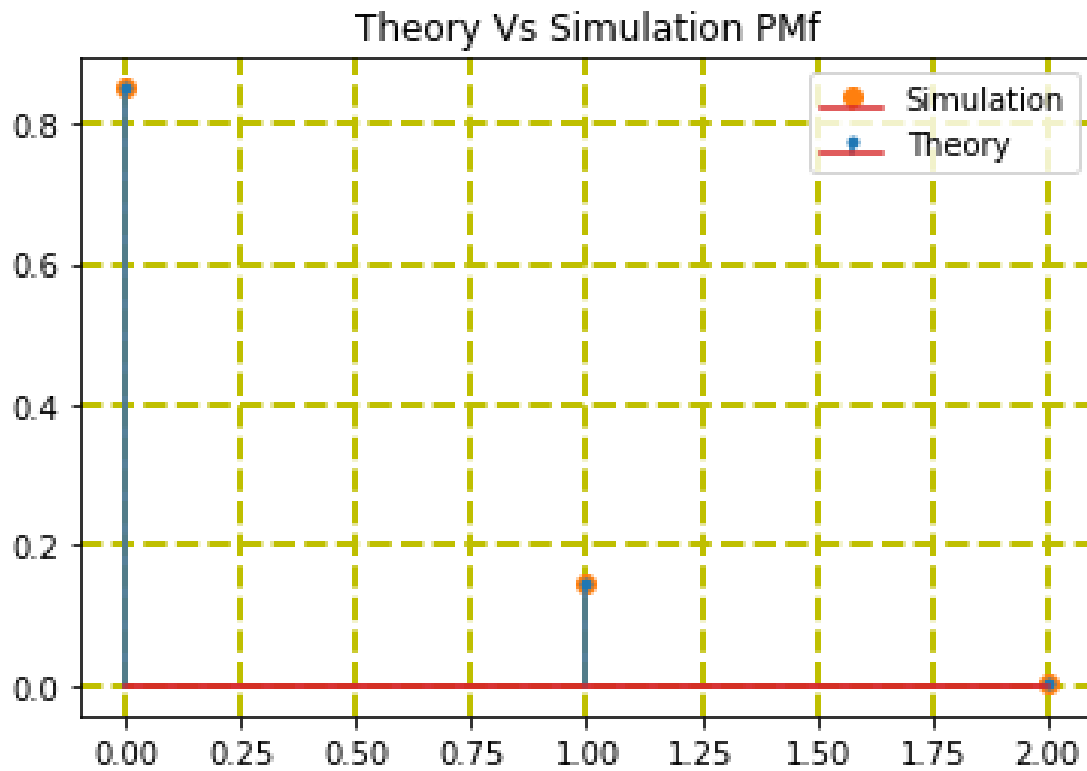


Fig 1.1: Theory Vs Simulation of PMf

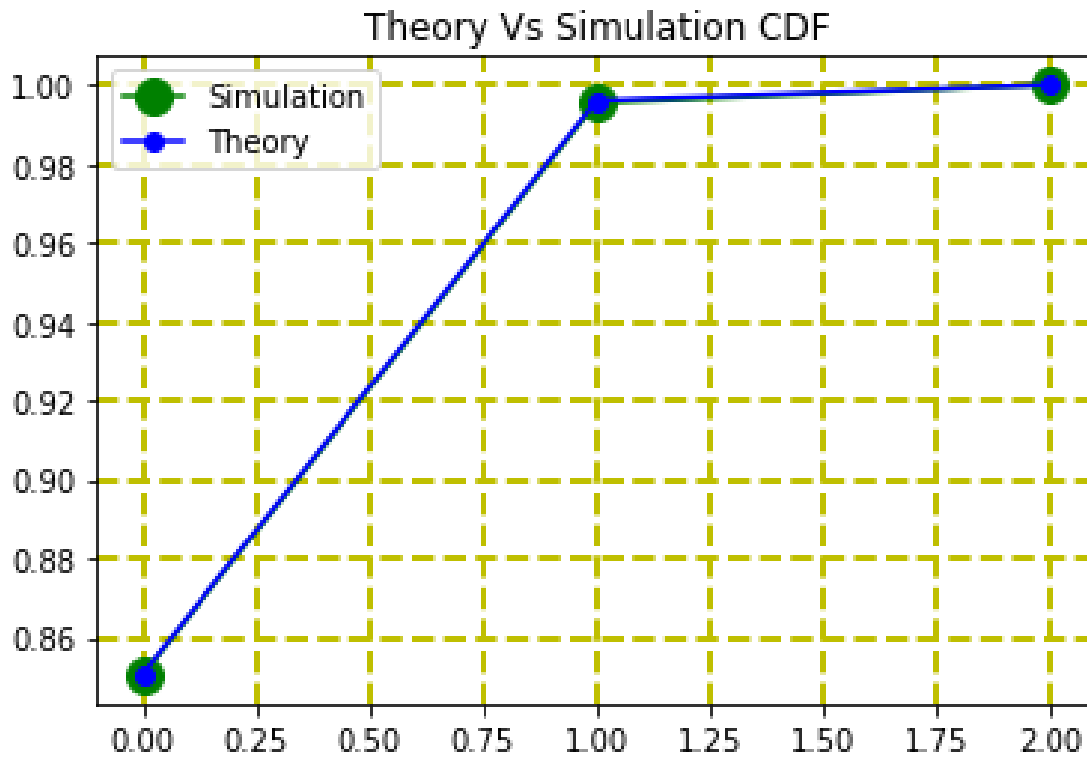


Fig 1.2: Theory Vs Simulation CDF