Statistics and Data Analysis

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Question 3 - Multinomial Distributions

(a) Let $X \sim Multinomial(n, \vec{p})$ be a multinomial random variable where $n = 20$ and $\vec{p} = (0.2, 0.1, 0.1, 0.1, 0.2, 0.3)$. Note that X is a vector of counts.

(b) Let $Y = X_2 + X_3 + X_4$ be a random variable.

(c) Create $k = 100$ experiments where X is sampled using Python. Calculate the empirical centralized third moment of Y based on your k experiments.

(d) Compare your result to the calculation in class for the centralized third moment of the binomial distribution and explain your observation.