DATA130004: Homework 4

Due in class on November 1, 2021

1. Revisit the proof of Proposition 5.3 on page 148. Explain why X^* and Y^* from the two-stage experiment have the same distribution as X and Y/k, respectively.

2. Exercises 6.1 and 6.9.

3. Prove that the k-level trimmed mean estimator has expectation zero when n random samples are independently generated from standard normal distribution.

4. Suppose $X_1, \ldots, X_n$ are i.i.d. samples from a normal distribution $N(\mu, \sigma^2)$, $n \geq 2$. Prove that $\sum_{i=1}^{n}(X_i - \bar{X})^2/\sigma^2$ follows a $\chi^2(n-1)$ distribution and it is independent with the sample mean $\bar{X}$.