

MSAI Statistics Home Assignment 1

Problem 1. Let $X_1, \dots, X_n \sim U[0, \theta]$ and let $\hat{\theta} = \max\{X_1, \dots, X_n\}$. Find:

- (2 point) bias of this estimator
- (2 point) standard error of this estimator
- (1 point) MSE of this estimator

Bonus questions:

- (1 bonus) Is this estimator consistent?
- (1 bonus) Is this estimator strongly consistent?

Problem 2. Let $X_1, \dots, X_n \sim U[0, \theta]$ and let $\hat{\theta} = 2\overline{X_n} = \frac{2}{n} \sum_{k=1}^n X_k$. Find:

- (2 point) bias of this estimator
- (2 point) standard error of this estimator
- (1 point) MSE of this estimator

Bonus questions:

- (1 bonus) Is this estimator consistent?
- (1 bonus) Is this estimator strongly consistent?