hw_mc_01

February 13, 2019

Given i.i.d $\{\alpha_i : i \in 1, 2, \ldots, N\}$, we use

$$\bar{\alpha}_N = \frac{1}{N} \sum_{i=1}^{N} \alpha_i$$

as its estimator of the mean $\mathbb{E}[\alpha_1]$ and

$$\beta_N = \frac{1}{N} \sum_{i=1}^{N} (\alpha_i - \bar{\alpha}_N)^2$$

as the estimator of $Var(\alpha_1)$.

Suppose $\alpha_1 \in L^4$, then

- Prove β_N is biased.
- Prove that β_N is consistent in L^2.
- Can you propose an unbiased estimator?