4. Exercise: LMS estimation

Exercises due Apr 15, 2020 05:29 IST *Completed*

Exercise: LMS estimation

1/1 point (graded)

Let Θ be the bias of a coin, i.e., the probability of Heads at each toss. We assume that Θ is uniformly distributed on $[0,1]$. Let K be the number of Heads in 9 independent tosses.

By performing some fancy and very precise measurements on the structure of that particular coin, we determine that $\Theta = 1/3$. Find the LMS estimate of K based on Θ.

3 ✔ **Answer:** 3

Solution:

Do not be confused by the choice of notation. Here, K is the variable being estimated and Θ is an observation. The posterior in this case is $p_{K|\Theta}$ and is a binomial distribution with parameters 9 and $1/3$. Thus, the LMS estimate is $\mathbf{E}\left[K \mid \Theta = \theta\right] = n\theta = 9/3 = 3$.

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Answers are displayed within the problem

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Hint

Remember the formula for the mean of the binomial distribution.

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