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Exercise: Possible values of the estimates

(1/2 points)

Suppose that the random variable Θ takes values in the interval $[0, 1]$.

a) Is it true that the LMS estimator is guaranteed to take values only in the interval $[0, 1]$?

Yes ✔ **Answer:** Yes

b) Is it true that the LLMS estimator is guaranteed to take values only in the interval $[0, 1]$?

Yes ✖ **Answer:** No

Answer:

a) The conditional expectation $\mathbf{E}[\Theta \mid X = x]$ is a weighted average of the values of Θ, weighted according to the posterior PDF. A weighted average of values in $[0, 1]$ must lie in $[0, 1]$.

b) On the other hand, there is no such guarantee for the LLMS estimator. You can see this from the picture in the last example. Or you may consider the example where $X = \Theta + W$, where W can take any real value. Then, the term aX can take any real value, and can therefore fall outside the range $[0, 1]$.

You have used 1 of 1 submissions


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