



Bookmarks

- ▶ Unit 0: Overview
- ▶ Entrance Survey
- ▶ Unit 1: Probability models and axioms
- ▶ Unit 2: Conditioning and independence
- ▶ Unit 3: Counting
- ▶ Unit 4: Discrete random variables
- ▶ Exam 1
- ▶ Unit 5: Continuous random variables
- ▶ Unit 6: Further topics on random variables
- ▼ Unit 7: Bayesian inference

Unit 7: Bayesian inference > Lec. 17: Linear least mean squares (LLMS) estimation > Lec 17 Linear least mean squares LLMS estimation vertical3



Bookmark

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 $\mathbf{E}[\Theta | \mathbf{X} = \mathbf{x}]$ 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 $\mathbf{X} = \Theta + \mathbf{W}$, where \mathbf{W} can take any real value. Then, the term \mathbf{aX} can take any real value, and can therefore fall outside the range $[0, 1]$.

You have used 1 of 1 submissions


Unit overview**Lec. 14:
Introduction to
Bayesian inference**

Exercises 14 due Apr
06, 2016 at 23:59 UTC 


**Lec. 15: Linear
models with
normal noise**

Exercises 15 due Apr
06, 2016 at 23:59 UTC 


Problem Set 7a

Problem Set 7a due
Apr 06, 2016 at 23:59
UTC 


**Lec. 16: Least
mean squares
(LMS) estimation**

Exercises 16 due Apr
13, 2016 at 23:59 UTC 

**Lec. 17: Linear
least mean
squares (LLMS)
estimation**

Exercises 17 due Apr
13, 2016 at 23:59 UTC 

Problem Set 7b

Problem Set 7b due
Apr 13, 2016 at 23:59
UTC 

Solved problems**Additional
theoretical
material****Unit summary**

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