12. Exercise: Multidimensional challenges

Exercise: Multidimensional challenges

2/2 points (graded)

Suppose that f_Θ and $f_{X|\Theta}$ are described by simple closed-form formulas. Suppose that Θ is one-dimensional but X is high-dimensional.

a) Suppose that a specific value x of the random variable X has been observed. Is it true that the calculation of the LMS estimate will always involve only ordinary integrals (integrals with respect to only one variable)?

Yes ▼ ✔ **Answer:** Yes

b) Is it true that the calculation of the mean squared error of the LMS estimator will always involve only ordinary integrals (integrals with respect to only one variable)?

No ▼ ✔ **Answer:** No

Solution:

a) The denominator in Bayes' rule involves an integral with respect to θ. Once the conditional PDF is available, the LMS estimate is calculated by integrating again over the one-dimensional variable θ.

b) In this case, we need to average the conditional variance over all possible values of x, and this will involve a multiple integral.

提交 You have used 1 of 1 attempt

Answers are displayed within the problem

讨论

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Topic: Unit 7 / Lec. 16 / 12. Exercise: Multidimensional challenges

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Can I describe things like this?

question posted 9 days ago by **butterandfly**

When X is observed, we can get the estimate $\hat{\theta}_{LMS}$. And we can calculate the MSE (performance) of this estimate.
When X is not observed, we can get the estimator $\hat{\Theta}_{LMS}$. And we can calculate the MSE (performance) of this estimator.
In both case, the MSE is a number.

此帖对所有人可见。

SergK (Community TA)
9 days ago - 9 days ago 前被 **e_kizildag** (Staff) 标记为答案

Yes. In the 1st case MSE is conditional on observation ($X = x$), in the 2nd case unconditional.

显示评论 (3)

Preview

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