



Bookmarks

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Bookmark

Exercise: Multiple observations, more general model

(1/1 point)

Suppose that $X_1 = \Theta + W_1$ and $X_2 = 2\Theta + W_2$, where Θ, W_1, W_2 are independent standard normal random variables. If the values that we observe happen to be $X_1 = -1$ and $X_2 = 1$, then the MAP estimate of Θ is

1/6



Answer: 0.16667

Answer:

The numerator term of the posterior is equal to a constant times

$$e^{-\theta^2/2} e^{-(x_1 - \theta)^2/2} e^{-(x_2 - 2\theta)^2/2}.$$


To find the MAP estimate, we set x_1 and x_2 to the given values, and set the derivative of the exponent (with respect to θ) to zero. We obtain

$$\theta + (\theta + 1) + 2(2\theta - 1) = 0,$$


which yields $6\theta - 1 = 0$ or $\theta = 1/6$.

You have used 1 of 2 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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