8. Exercise: Multiple observations, more general model

Exercise: Multiple observations, more general model

0/1 point (graded)

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

-1/3

✖ **Answer:** 0.16667

Solution:

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 $\theta = 1/6$.

提交 You have used 3 of 3 attempts

Answers are displayed within the problem

讨论

显示讨论

Topic: Unit 7 / Lec. 15 / 8. Exercise: Multiple observations, more general model