

BAYESIAN STATISTICS

HOME WORK # 5

Saturday, May 23, 2020

Problem 1. Suppose 5 percent of men and 0.25 percent of women are color blind. A color-blind person is chosen at random. What is the probability of this person's being male? Assume that there are an equal number of males and females. What if the population consisted of twice as many males as females?

Problem 2. Given θ , the random variable X has a binomial distribution with $n = 2$ and probability of success θ . If the prior density of θ is

$$p(\theta) = \begin{cases} k & \text{if } \frac{1}{2} < \theta < 1 \\ 0 & \text{otherwise} \end{cases}$$

what is the Bayes estimate of θ for a squared error loss if $X = 0$.

Problem 3. Given θ , the random variable X has a binomial distribution with $n = 3$ and probability of success θ . If the prior density of θ is

$$p(\theta) = \begin{cases} k & \text{if } \frac{1}{2} < \theta < 1 \\ 0 & \text{otherwise} \end{cases}$$

what is the Bayes estimate of θ for an absolute error loss if $X = 1$.

Problem 4. Given θ , the random variable X has a binomial distribution with $n = 2$ and probability of success θ . If the prior density of θ is

$$p(\theta) = \begin{cases} k & \text{if } \frac{1}{2} < \theta < 1 \\ 0 & \text{otherwise} \end{cases}$$

what is the Bayes estimate of θ for a squared error loss if $X_1 = 1$ and $X_2 = 2$.