HW 9

Problem 1 (8.66) Let θ be the unknown probability that a basketball player makes a shot successfully. Suppose your prior on θ is $U[0,1]$ and that you observe the basketball player make two successful shots in a row. Assume the outcomes of these two shots are independent.

(a) What is the posterior density of θ?

(b) What would you estimate is the probability that this player makes a third shot? Explain your reasoning.

Problem 2 (8.68) Let $X_1, \ldots, X_n$ be an IID sample from a $Poisson(\lambda)$ distribution. Let $T = \sum_{i=1}^{n} X_i$.

(a) Show that T is sufficient by deriving the distribution of $(X_1, \ldots, X_n)$, given T, and showing that it is independent of λ.

(b) Show that T is sufficient by the Factorization Theorem.

Problem 3 (8.68) Let $X_1, \ldots, X_n$ be an IID sample from a $Poisson(\lambda)$ distribution. Show that the estimate X_1 is not sufficient.