Assignment 2B: Introduction to Bayesian Statistics (Points 28)

Q1 (14 points). The number of claims received by an insurance company during a week follows a *Poisson* (μ) distribution. The weekly number of claims observed over a ten week period is: 5, 8, 4, 6, 11, 6, 6, 5, 6, and 4.

a. Suppose a prior uniform distribution is used for μ.

i. Find the posterior distribution for μ.

ii. What are the posterior mean, median, and variance in this case?

b. Suppose Jeffrey's prior is used for μ.

i. Find the posterior distribution for μ.

ii. What are the posterior mean, median, and variance in this case?

Ans:

Q2 (14 points). The number of defects per 10 meters of cloth produced by a weaving machine has the Poisson distribution with mean μ. You examine 100 meters of cloth produced by the machine and observe 71 defects.

a. Your prior belief about μ is that it has mean 6 and standard deviation 2. Find a gamma (r, v) prior that matches your belief.

b. Find the posterior distribution of μ given that you observed 71 defects in 100 meters of cloth.

c. Calculate a 95% Bayesian credible interval for μ.

Ans:

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