

? question @30

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Problem 5.14(b)

14. Hierarchical Poisson model: consider the dataset in the previous problem, but suppose only the total amount of traffic at each location is observed.
- (a) Set up a model in which the total number of vehicles observed at each location j follows a Poisson distribution with parameter θ_j , the 'true' rate of traffic per hour at that location. Assign a gamma population distribution for the parameters θ_j and a noninformative hyperprior distribution. Write down the joint posterior distribution.
 - (b) Compute the marginal posterior density of the hyperparameters and plot its contours. Simulate random draws from the posterior distribution of the hyperparameters and make a scatterplot of the simulation draws.
 - (c) Is the posterior density integrable? Answer analytically by examining the joint posterior density at the limits or empirically by examining the plots of the marginal posterior density above.
 - (d) If the posterior density is not integrable, alter it and repeat the previous two steps.
 - (e) Draw samples from the joint posterior distribution of the parameters and hyperparameters, by analogy to the method used in the hierarchical binomial model.

Is the Jacobian for this problem the same as the one in problem 5.13(a) ($\frac{e^{2Y+X}}{(e^X+1)^2}$)? I was able to get a contour plot but it's not centered on $(\ln \frac{\alpha}{\beta}, \ln(\alpha + \beta))$. Does that matter? Is the choice of $p(\alpha, \beta)$ affecting this?

hw3

Edit

good question | 0

Updated 2 years ago by Charles Hwang

S

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