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MTH6102: Bayesian Statistical Methods

Exercise sheet 9

2023-2024

1. For the data, model and prior distribution of exercise sheet 3, question 1 (first part), write code to calculate the prior distribution and likelihood. Put this code inside the function for the target distribution of the Metropolis algorithm, and run the algorithm for 10,000 steps. Use a proposal scale of $s = 0.3$.

From the resulting approximate sample from the posterior distribution of λ , calculate the posterior median and a 95% credible interval for λ .

Also calculate these posterior summaries using the `qgamma` command, and check that they are similar to the values found using the Metropolis algorithm.

The last part needs a little more R coding.

Add code to count how many times the proposed value for λ was accepted. Rerun the algorithm using values of $s = 0.05, 0.1, 0.15, \dots, 0.5$, and each time calculate the proportion of steps that were accepted. Then plot this acceptance probability against s . Which value of s gives an acceptance probability closest to the rule of thumb of 23%?