

MATH 598/782 - PROJECT 5

Please submit your project by 6.00 pm (EDT) on Monday 16th November by uploading a single pdf to myCourses.

The model arising in pharmacokinetics discussed in knitr 9

$$y(x) = D\beta_0(\exp\{-\beta_1x\} - \exp\{-(\beta_1 + \beta_2)x\}) = \mu(x, D, \beta_0, \beta_1, \beta_2) \quad x > 0$$

say, for parameters $\beta_0, \beta_1, \beta_2 > 0$ is an example of a non-linear regression model. If

$$\log Y(x_i) = \log \mu(x, D, \beta_0, \beta_1, \beta_2) + \varepsilon_i$$

where, for $i = 1, \dots, n$, $\varepsilon_i \sim \text{Normal}(0, \sigma^2)$ are independent residual errors, then a Bayesian analysis can be carried out.

Consider the data in the file

`www.math.mcgill.ca/dstephens/598-Bayes-2020/Projects/Project5.csv`

Using these data and the model above, and with the knowledge that $D = 100$, produce a sample from the posterior distribution for $(\beta_0, \beta_1, \beta_2)$ using MCMC methods. You may adapt code from knitr 8,