

Math 797: Project 5

Due Wednesday, April 23

1. In Exercise 8.2 of Project 3, you used DRAM to construct densities for Φ and h in the steady-state heat model (3.21) using aluminum rod data. As illustrated in Figure 12.1 of Example 12.1, the residuals for the model fit to copper data are not iid, which violates the hypotheses for our Bayesian analysis. To address this, consider the statistical model

$$\Upsilon_i = f(x_i, q) + \beta_0 + \beta_1 x_i + \beta_2 x_i^2 + \varepsilon_i,$$

where the augmented parameter set is now $q_{aug} = [\Phi, h, \beta_0, \beta_1, \beta_2]$. The optimal values q_{aug} , given in Example 12.6, yield the iid residuals shown in Figure 12.9.

Modify your DRAM code from Exercise 8.2 and use it to construct densities for the augmented parameter set using the copper data. How do the means of your marginal posterior densities compare with your least squares estimates?