

## Math 540: Project 6

Due Thursday, April 26

Please do ONE of the following problems.

1. Perform parameter selection or uncertainty quantification for a problem of your choice. In your writeup, please motivate the problem and discuss your results.
2. Consider the Dittus-Boelter equation

$$Nu = q_1 Re^{q_2} Pr^{q_3} \quad (1)$$

where  $Nu$ ,  $Re$  and  $Pr$  respectively denote the Nusselt, Reynolds and Prandtl numbers. Reported nominal parameter values are

$$q_0 = [0.023, 0.8, 0.4] \quad (2)$$

and data is provided in the file `db_data.txt` where `Re = db_data(:,1)`; `Pr = db_data(:,2)`; `Nu = db_data(:,3)`.

Construct the Fisher information matrix and discuss the identifiability of the parameters. Now use DRAM to compute posterior densities for the parameters. Are your pairwise plots consistent with the Fisher information results?