

## Statistics 624: Statistical Computing

### Homework # 11

Due Tuesday, 30 Oct., 8am

In this assignment, please complete, organize, and turn in **electronically** to `stat624@stat.byu.edu`.

Use the data in `dilemma.dat`. The first three columns are  $X_1, X_2, X_3$ . Ignore the fourth column. Supplement the  $\mathbf{X}$  matrix with a column of ones.

1. Modify the code from the course web page to compute the **QR** decomposition of the dilemma data.
2. Compare the **Q** and **R** matrices from the C code with those from the R function `qr` on the dilemma data.
3. Create the scatterplot matrix of the columns of the **Q** matrix for the dilemma data. Comment on how well the data spans the space and the presence of any potentially influential observations.
4. Compute the **QR** decomposition of  $\mathbf{X}_s$ , which consists of the columns  $X_1, X_2, X_3$  standardized by subtracting the mean and dividing by the standard deviation. Comment on the difference between the **QR** matrices of  $\mathbf{X}$  and  $\mathbf{X}_s$ .
5. Create the scatterplot matrix of the columns of the **Q** matrix of  $\mathbf{X}_s$ . Comment on any differences between this plot and the plot from 3.