Math 583 HW 7 Fall 2020 Due Friday, Oct. 16.

Quiz 7 on Wednesday will have problems on getting $\hat{Y}$ from MLR output, MLR outlier detection, RR, FF, response and residual plots, resistant MLR estimators like the MBA estimator. Note that Exam 2 is now Friday Oct. 23. Final: Monday, Dec. 7, 8-10 AM.

Problem numbers are from Olive (2020). Do the source commands from homework 4.

R problems

5.10*. a) After entering the two *source* commands above, enter the following command.

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MLRplot(buxx,buxy)
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Click the rightmost mouse button (and in *R* click on *Stop*). The response plot should appear. Again, click the rightmost mouse button (and in *R* click on *Stop*). The residual plot should appear. Hold down the *Ctrl* and *c* keys to make a copy of the two plots. Then paste the plots in *Word*.

b) The response variable is *height*, but 5 cases were recorded with heights about 0.75 inches tall. The highlighted squares in the two plots correspond to cases with large Cook's distances. With respect to the Cook's distances, what is happening, swamping or masking?

c) *RR plots:* One feature of the MBA estimator (see Chapter 6) is that it depends on the sample of 7 centers drawn and changes each time the function is called. In ten runs, about seven plots will look like Figure 6.1, but in about three plots the MBA estimator will also pass through the outliers. Make the RR plot by pasting the commands for this problem into *R*, and include the plot in *Word*.

d) *FF plots: the plots in the top row will cluster about the identity line if the MLR model is good or if the fit passes through the outliers.* Make the FF plot by pasting the commands for this problem into *R*, and include the plot in *Word*.

6.4bc.

b) Enter the command *mbamv(belx,bely)* in *R*. Click on the rightmost mouse button (and in *R*, click on *Stop*). You need to do this 7 times before the program ends. There is one predictor x and one response Y. The function makes a scatterplot of x and y and cases that get weight one are shown as highlighted squares. Each MBA sphere covers half of the data. When you find a good fit to the bulk of the data, hold down the *Ctrl* and *c* keys to make a copy of the plot. Then paste the plot in *Word*.

c) Enter the command *mbamv2(buxx,buxy)* in *R*. Click on the rightmost mouse button (and in *R*, click on *Stop*). You need to do this 14 times before the program ends. There are four predictors $x_1, ..., x_4$ and one response Y. The function makes the response and residual plots based on the OLS fit to the highlighted cases. Each MBA sphere covers half of the data. When you find a good fit to the bulk of the data, hold down the *Ctrl* and *c* keys to make a copy of the two plots. Then paste the plots in *Word*.

6.6. a) Type the *library(MASS)* command).

b) Type the command *tvreg(buxx,buxy,ii=1)*. Click the rightmost mouse button (and in *R*, highlight *Stop*). The response plot should appear. Repeat 10 times and remember which plot percentage *M* (say M = 0) had the best response plot. Then type the command *tvreg2(buxx,buxy, M = 0)* (except use your value of M, not 0). Again, click the rightmost mouse button (and in *R*, highlight *Stop*). The response plot should appear. Hold down the *Ctrl* and *c* keys to make a copy of the plot. Then paste the plot in *Word*.

c) The estimated coefficients $\hat{\boldsymbol{\beta}}_{TV}$ from the best plot should have appeared on the screen. Copy and paste these coefficients into *Word*.