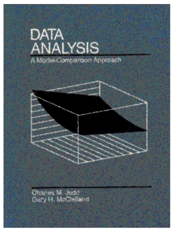
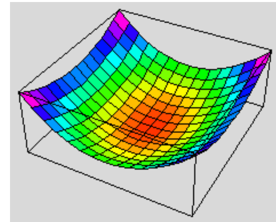


Handout from Psych 5741/5751
University of Colorado
used with
Judd, C.M., & McClelland, G.H. (1989).
Data Analysis: A Model Comparison Approach. HBJ.



Levers for Multiple Regression
(Two Predictors)

To simplify notation, assume that both predictors have been mean deivated so that $\bar{X}_1 = \bar{X}_2 = 0$. If that is not the case, then replace X_1 with $\left(X_1 - \bar{X}_1\right)$, etc.

In the general case (i.e., with redundancy), the levers or the diagonal entries of the hat matrix are given by:

$$h_{ii} = \frac{1}{n} + \frac{X_{1i}^2 \sum X_2^2 - X_{1i} X_{2i} \sum X_1 X_2}{\sum X_1^2 \sum X_2^2 - \left(\sum X_1 X_2\right)^2} + \frac{X_{2i}^2 \sum X_1^2 - X_{1i} X_{2i} \sum X_1 X_2}{\sum X_1^2 \sum X_2^2 - \left(\sum X_1 X_2\right)^2}$$

If there is no redundancy, then $\sum X_1 X_2 = 0$, so the above reduces to what we would expect, namely

$$h_{ii} = \frac{1}{n} + \frac{X_{1i}^2}{\sum X_1^2} + \frac{X_{2i}^2}{\sum X_2^2}$$

For more than two predictors, we will be content to allow the matrix routines in the statistical programs to compute the levers for us.