Homework 4 - Stat 215A, Fall 2014

Due: Wednesday, November 12, 4:00 PM.

Note – November 11th is a school holiday, so we will not have a regular lab section on Tuesday, November 11th. Please put this homework in the GSI's mailbox in 367 Evans by the Wednesday at 4pm.

Classification

Read section 7.2 (p. 121) on probit models in Freedman and complete questions 1,2, and 3 in Excercise set B on page 124.

The Hat Matrix

The Sherman Morrison formula gives us an expression for the inverse of a rank-1 update to a matrix. If A is an invertible $n \times n$ matrix, and $u, v \in \mathbb{R}^n$.

$$\left(A + uv^T\right)^{-1} = A^{-1} - \frac{A^{-1}uv^TA^{-1}}{1 + v^TA^{-1}u}$$

Use this to prove equations (5.1) and (5.5) in Hoaglin, David C., and Roy E. Welsch. "The hat matrix in regression and ANOVA." (available on bSpace). Note that they consider $\mathbf{x}_i$ a column vector - you can use either convention. Also, equation (5.5) contains a typo, and should be:

$$\hat{\boldsymbol{\beta}} - \hat{\boldsymbol{\beta}}_{(i)} = \cdots$$