Homework 6, due October 18th, 11:59pm

October 11, 2017

1. Implement the FSA variable selection method for linear models and binary classification with the Lorenz loss or regression (square loss), as described in class. Use the parameters $s = 0.001, \mu = 100, N^{iter} = 500$. Take special care to **normalize each column** of the X matrix to have zero mean and variance 1 and to use the same mean and standard deviation that you used for normalizing the train set also for normalizing the test set.

a) Using the `Gisette` data, train a FSA classifier on the training set, starting with $\boldsymbol{\beta}^{(0)} = 0$ to select $k \in \{10, 30, 100, 300\}$ features. Plot the training loss vs iteration number for $k = 10$. Report in a table the misclassification errors on the training and test set for the models obtained for all these k. Plot the misclassification error on the training and test set vs k. (6 points)

b) On any of the other six **binary classification** datasets or the two **regression** datasets, using the training and test sets specified in the syllabus, repeat point a), adding the misclassification errors to the table from a). (1-3 points each as specified in the syllabus)