Task: I used the handwriting digits data set, and the objective objective is to separate digit "1" from the rest.

Result: The training and test performances, and the classification planes are shown by Fig. 1 and 2. Fig. 1 plots the training and test error at each pass of the performed algorithms. The SVM based algorithms at the end have lower error rates than the lease-square based algorithms. Fig. 2 presents the classification plans of each performed algorithms at selected passes, namely, 1th pass, 5th, 10th and 50th of the algorithms running through the entire data set. As shown in this figure, at each pass, the algorithms have different classification planes.
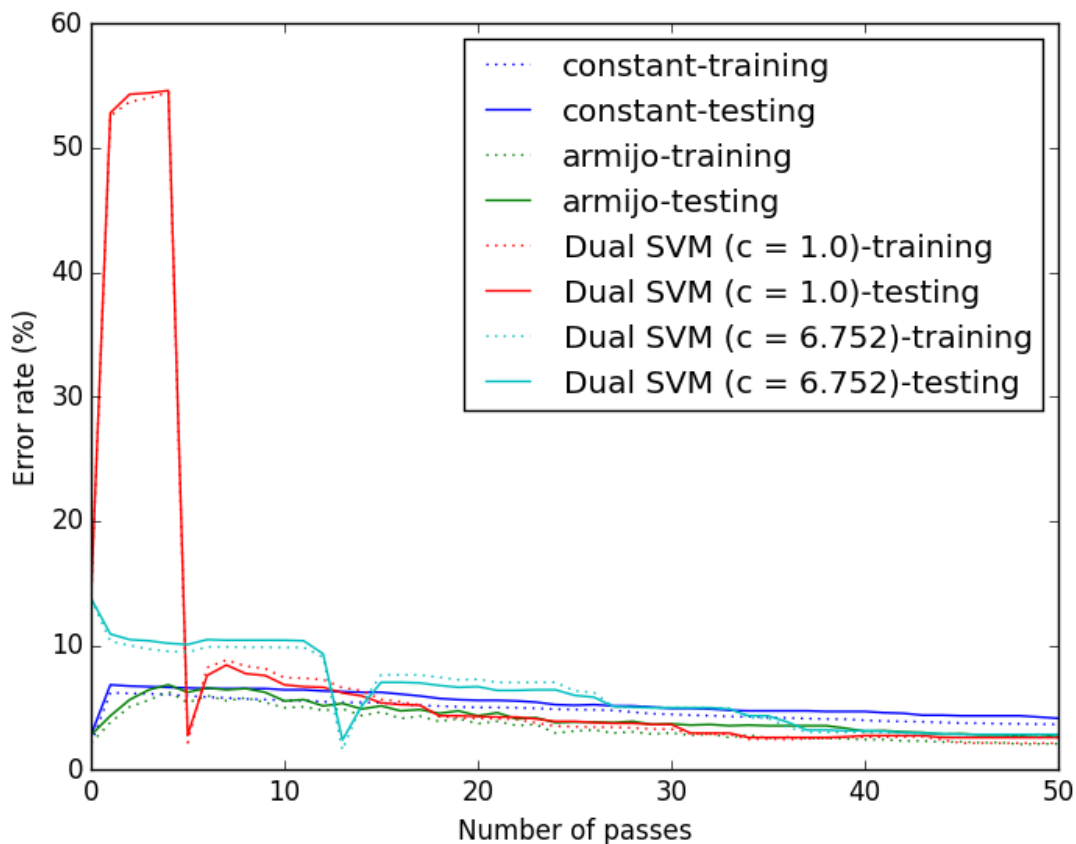

Figure 1: Test/training error

Discussion: If c is close to 0, then we don't pay that much for points violating the margin constraint. We can minimize the cost function by setting **x** to be a small vector; this is equivalent to creating a very wide "tube" or safety margin around the decision boundary (but having many points violate this safety margin). If c is close to infinite, then we pay a lot for points that violate the margin constrain, and we are close the hard-margin; in such case, we may be sensitive to outlier points in the training data.
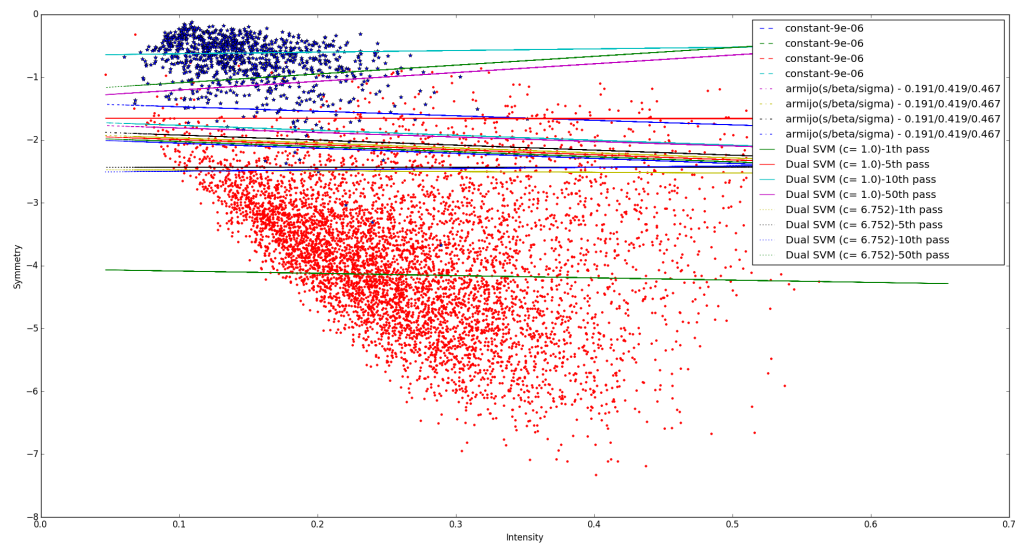
Figure 2: Classification planes