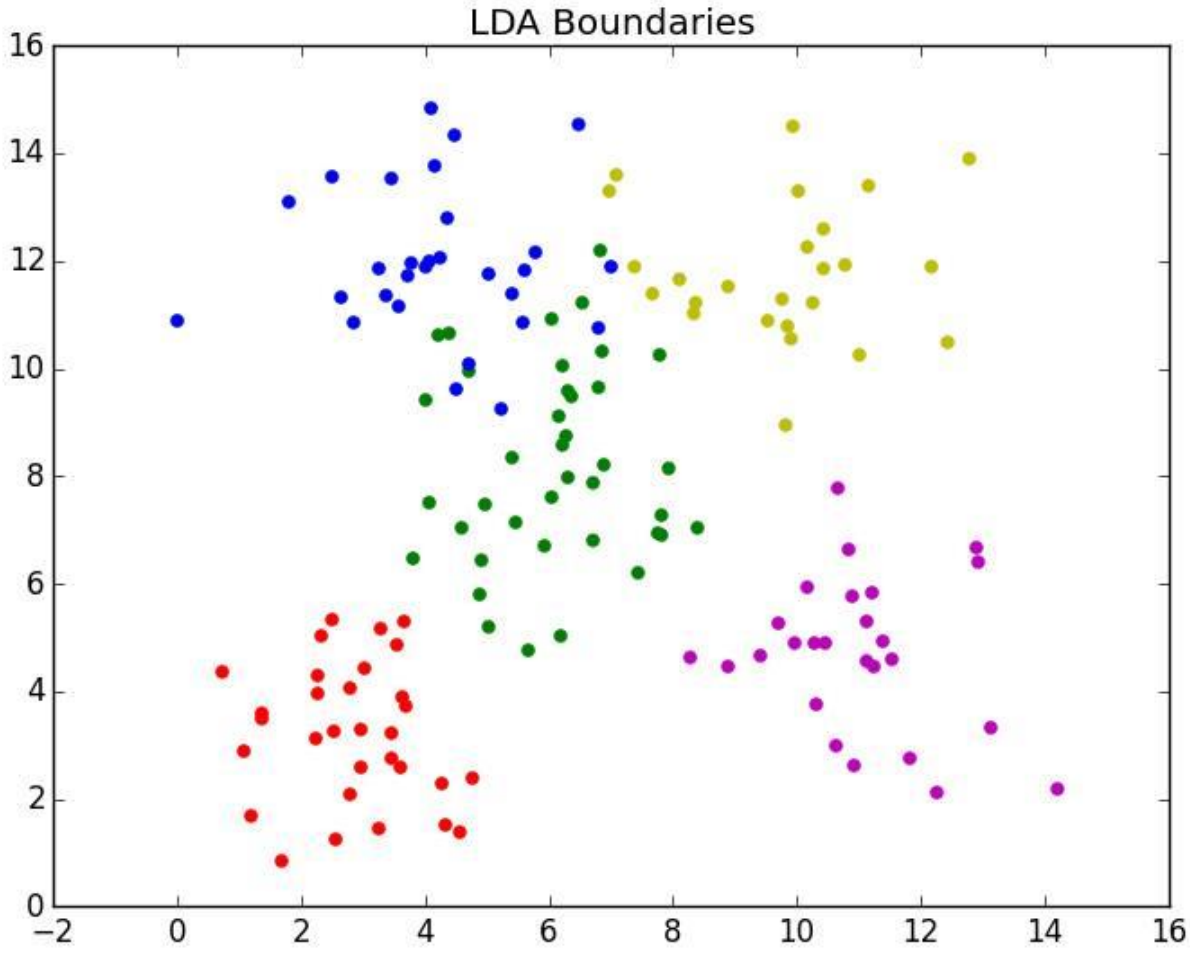
# Program Assignment #2 Report

**Problem 1)**

Accuracy of LDA: 91.95774311
Accuracy of QDA: 92.10428889




From what we have gathered, we did not see a difference between the linear and quadratic discriminating boundaries.

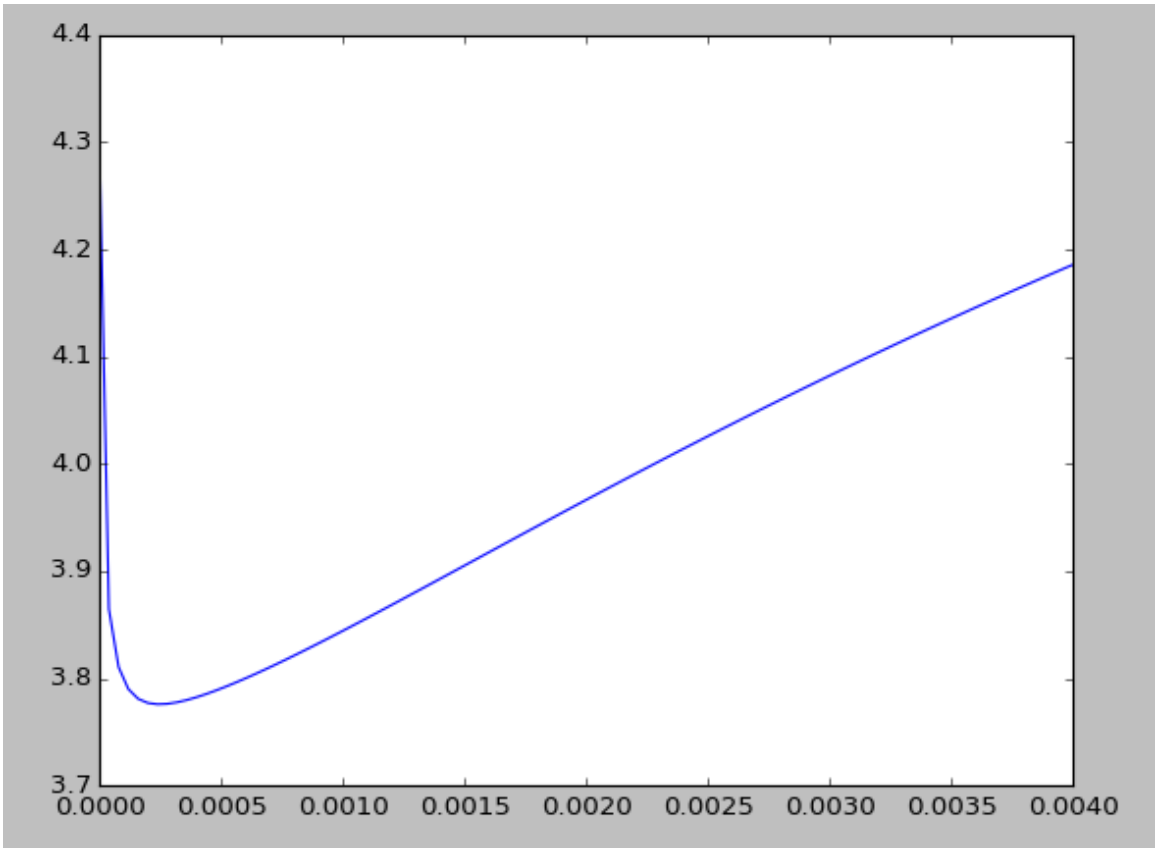
**Problem 2)**

RMSE without intercept [23.1057743385]
RMSE with intercept [4.30571723515]

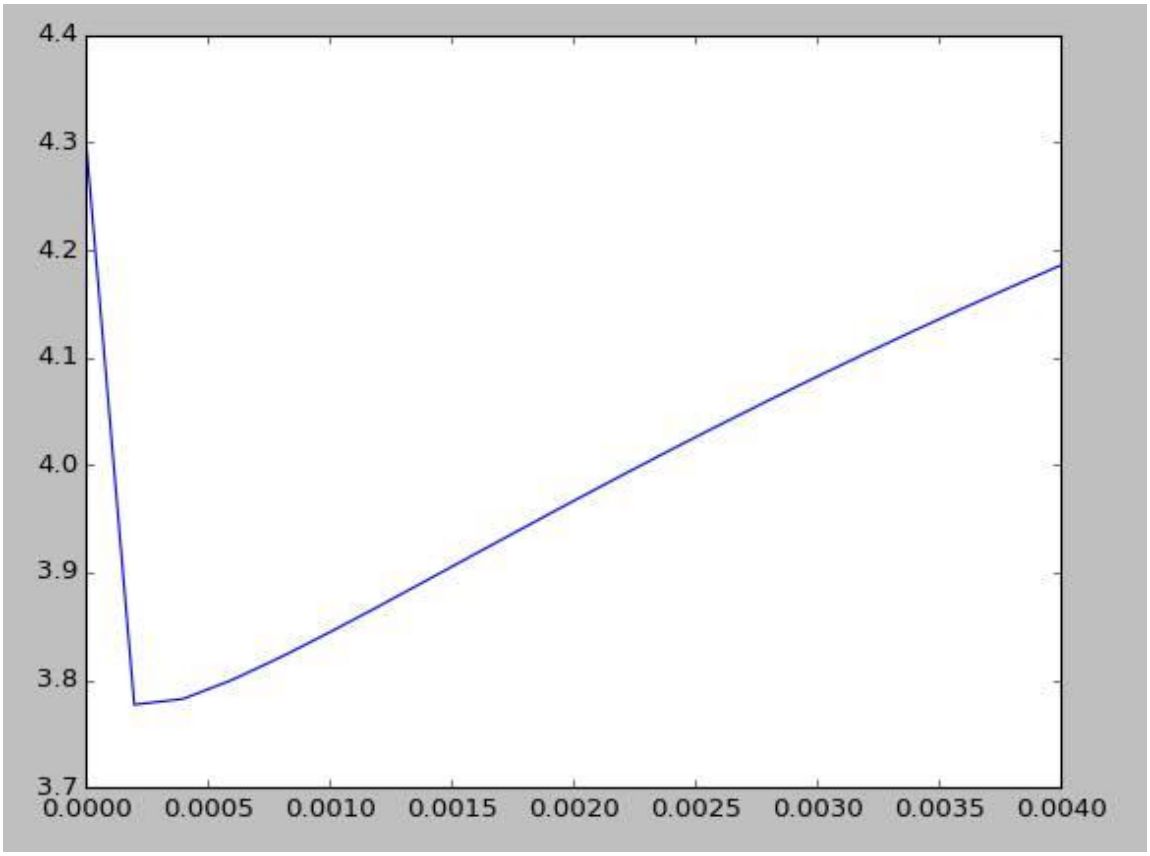
RMSE is better without intercept. With intercept, it adds in an extra value that causes the weight to change to be not as a proper weight. Since the weight is a natural weight, it will cause a higher or lower RSME than intended.

**Problem 3)**

**K = 101**



**K = 21**




**As you can see in the two graphs above, as K increases, you can see clearly where the curves happen.**

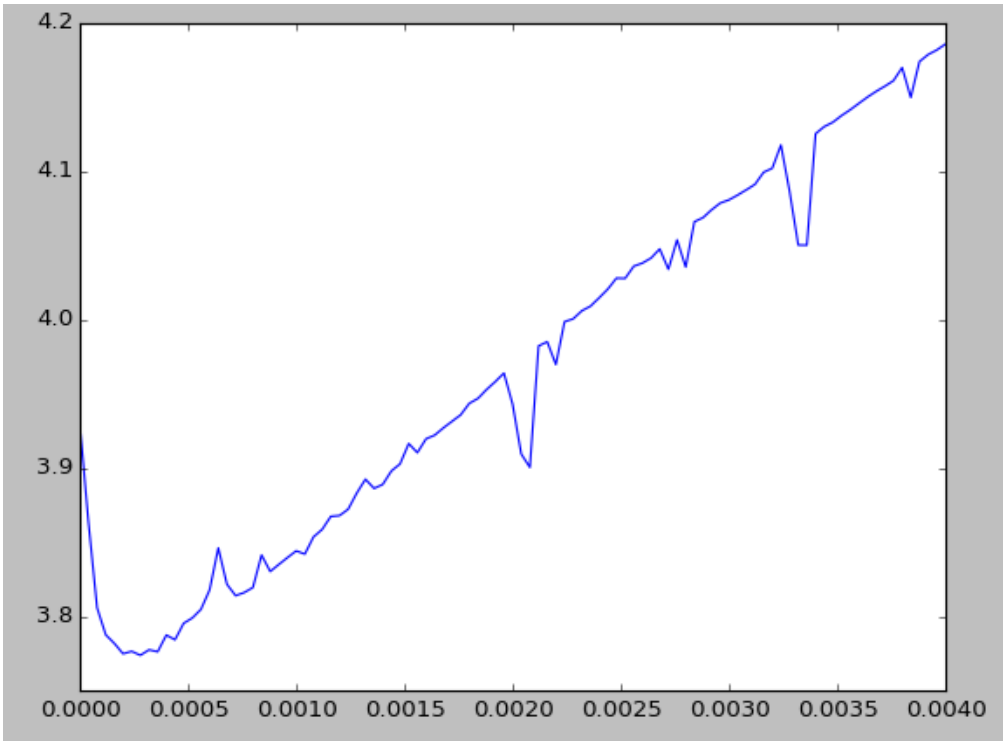
Compare the relative magnitudes of weights learnt using OLE (Problem 1) and weights learnt using ridge regression: the magnitude of weights is around -2.38458154e+01 to 9.69932251e+01

Compare the two approaches in terms of errors on train and test data: The errors range from 3.77582332 to 4.30571723. The difference is 0.52989391.

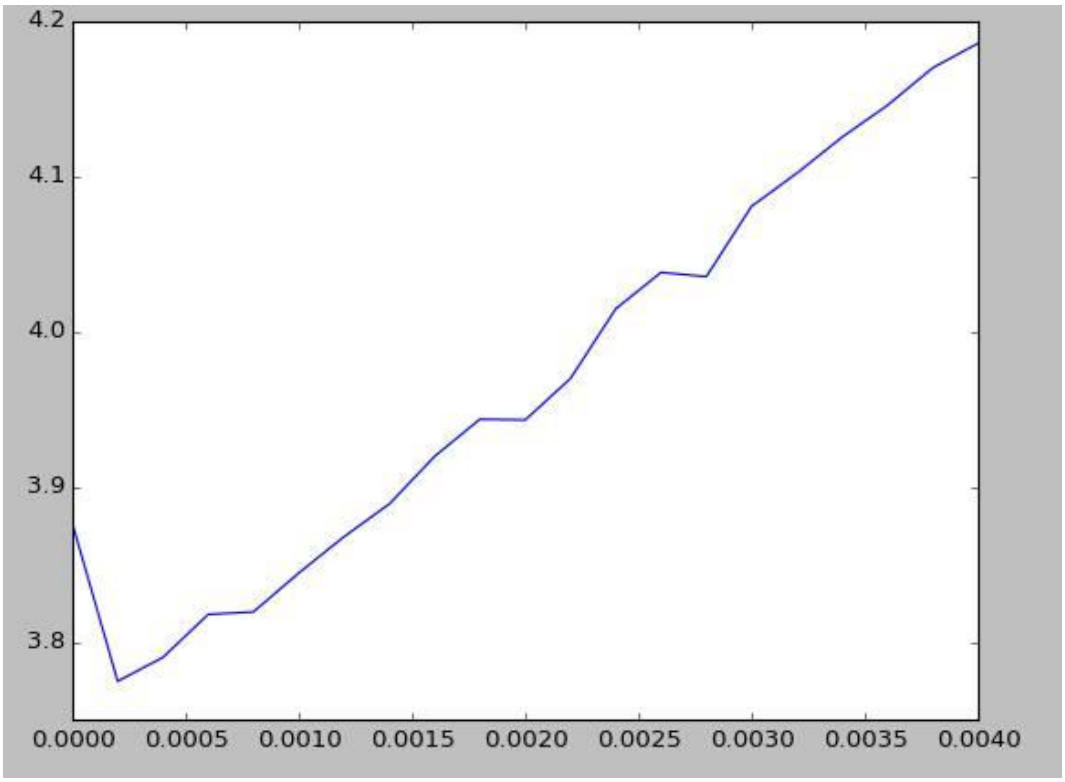
The optimal value of λ is 101 because you can pin point exactly where the curve turns.

**Problem 4)**

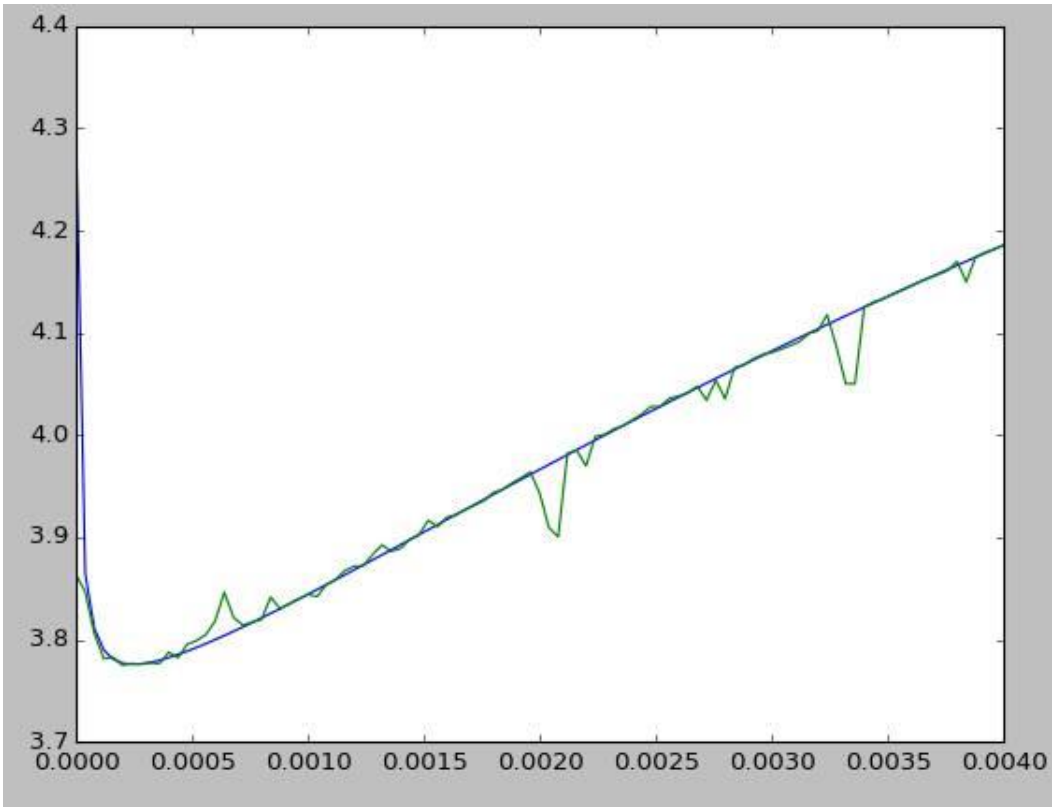
**K = 101**




**K = 21**




**As you can see, the visual difference between the two graphs is that 101 is more rigid than 21.**

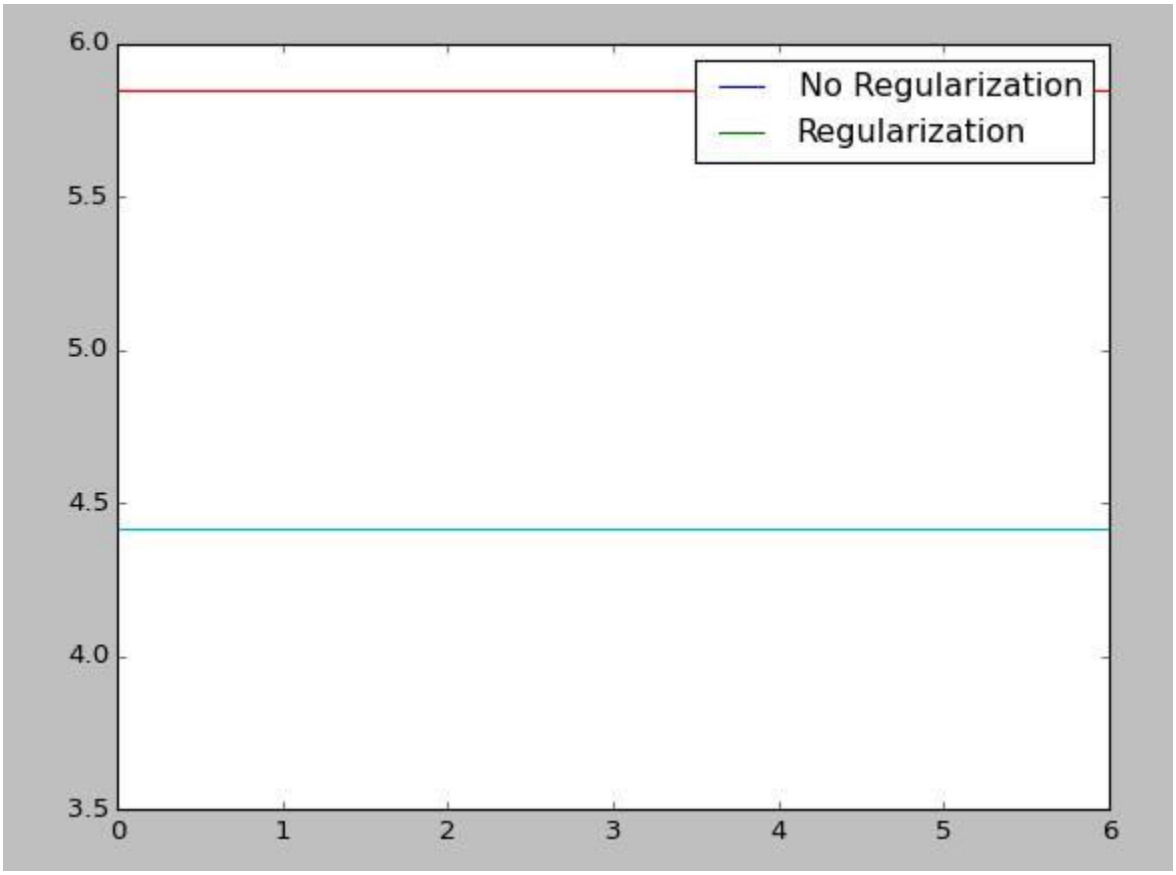



**Comparison with the results obtained in Problem 3**

**Problem 5)**

Compute the errors on train and test data: from 4.4185436 to 5.84527978

Compare the results for both values of λ: 0.0002




**Problem 6)**

Out of the four problems that we have solved, we believe that Ridge Regression would be the best to predict diabetes. We choose this due to how detailed the graph was for RMSE. We saw how the graph twists and turns with each changing variables when computing the weights. When dealing with diabetes, if the weights changes, it matters a lot. When the weight changes, that should be the indication or metric to choose for the best setting.