

Julio Soldevilla
EECS 545 Winter 2018 — Problem Set 3

Problem 1 Problem 1

Proof:

1. This is problem 1.a where we are using the linear kernel. In figure 1 we show the linear kernel with parameter $C = 1$ and in this case we have 12 support vectors and figure 1 shows the separating hyperplane.

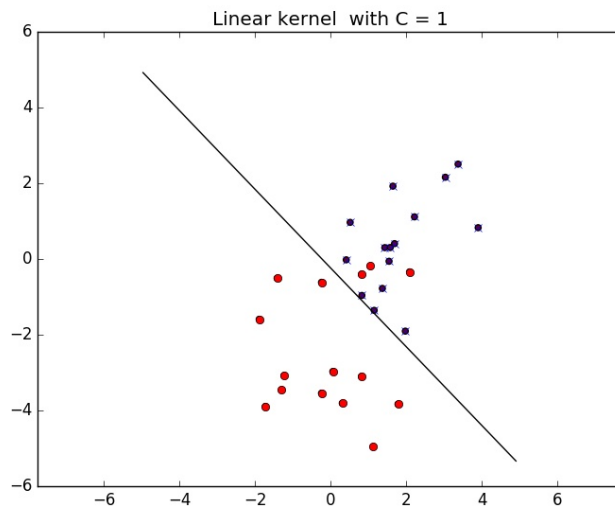


Figure 1: **Problem 1 part a:** Image showing the linear kernel with parameter $C = 1$

After this, we run the linear kernel this time with parameter $C = 100$ and in this case we have 10 support vectors and figure 2 shows the decision boundary from the algorithm.

2. This is problem 1.b where we are using the rbf kernel. In figure 3 we show the rbf kernel with parameter $C = 1$ and in this case we have 24 support vectors. Figure 3 shows the decision boundary in this case.

After this, in figure 4 we show the rbf kernel with parameter $C = 3$ and in this case we have 21 support vectors. Figure 4 shows the decision boundary in this case.

■

Problem 2 Problem 2

Proof:

■

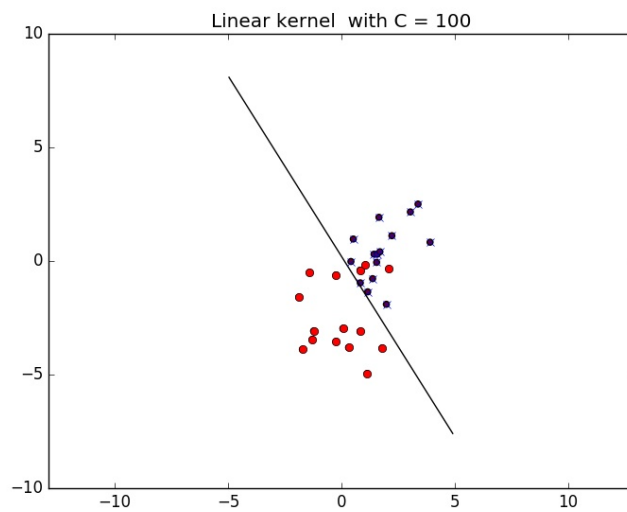


Figure 2: **Problem 1 part a:** Image showing the linear kernel with parameter $C = 100$

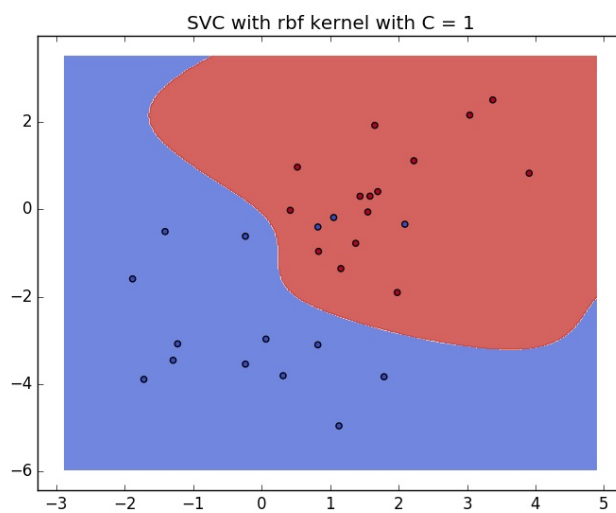


Figure 3: **Problem 1 part b:** Image showing the rbf kernel with parameter $C = 1$

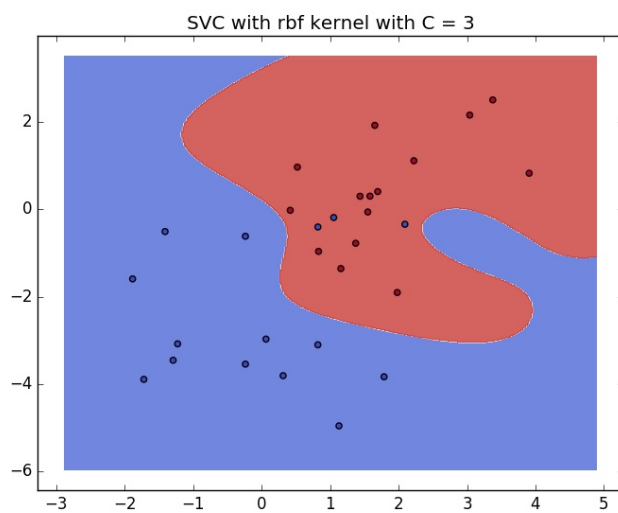


Figure 4: **Problem 1 part b:** Image showing the rbf kernel with parameter $C = 3$