

## CS6140 Machine Learning Fall 2014 Homework 6, Wei Luo

### PROBLEM 4

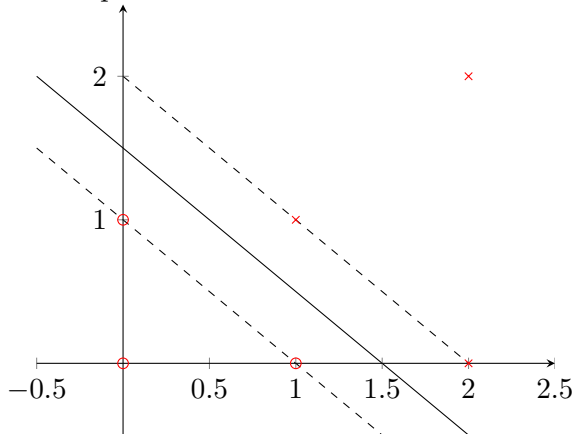
When  $\alpha = 0$ ,  $y_i(w^T x_i + b) > 1$ , these points are not support vectors.

When  $0 < \alpha < C$ ,  $y_i(w^T x_i + b) = 1$ , these points are support vectors on the margin line.

When  $\alpha = C$ ,  $y_i(w^T x_i + b) < 1$ , these points are support vectors inside the margin line. They could be even missclassified.

### PROBLEM 5

We can plot the data as follow: red x is for label 0 red o is for label 1



The optimal hyperplane is  $x+y-1=0$ . Margin is  $\sqrt{2}/4$

And support vectors are: (0, 1) (1, 0) (1, 1) (2, 0)