Coursework **Fall 2012**
Statistical Pattern Recognition (COMP136) **Roni Khardon**
Department of Computer Science, Tufts University

Assignment 6

This assignment is due by Thursday November 8 in class.

1. Solve problems 6.8, 6.15, 6.16 pages 320-321.

2. [**optional - extra credit**] Solve problem 7.7 page 357. Please give all the details of the derivation from primal to dual instead of using intermediate results quoted in text.

3. [**optional - extra credit**] (from Shawe-Taylor and Cristianini text page 89) A ball of radius R centered at point v is the set

$$B_R(v) = \{x \ : \ ||x - v||^2 \leq R^2\}.$$

We are given a dataset $S = \{x_1, \ldots, x_N\}$ (each x_i is a point in Euclidean space) and want to find the ball of smallest radius that contains S.

Express this problem as an optimization problem, minimizing R subject to the constraints, and then convert it to dual form. Notice in your solution that the dual form allows us to express the solution in terms of kernels.