CSE 5526 - Autumn 2019

Introduction to Neural Networks

Homework #3

Due Thursday, October 24

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Problem 1. Given the following linearly separable training patterns:

$$\mathbf{x}_1 = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, d_1 = 1$$

$$\mathbf{x}_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}, d_2 = -1$$

$$\mathbf{x}_3 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}, d_3 = -1$$

find $\mathbf{w}_o$ and b_o for the optimal hyperplane by optimizing the Lagrangian function. Write down the discriminant function, and specify which of the input patterns are support vectors.

Problem 2. Prove that the kernel matrix **K** is positive semidefinite (for definition see p. 283 of the textbook) for inner-product kernel functions.