

# Homework 6: Transductive Support Vector Machines

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Data Mining II

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## 1 Exercise 1

### 1.a

See *1a-WAKONIG.pdf* in homework folder.

### 1.b

See *svm\_linear.py*.

```
Inductive SVM  
Accuracy: 0.855
```

```
Inductive SVM variate  
Accuracy: 0.855
```

## 2 Exercise 2

### 2.a

See *tsvm\_linear.py*.

Transductive SVM

Accuracy: 0.9683333333333334

### 2.b

Since  $C_1$  and  $C_2$  control the slack variables, they represent the weights or influence the training data (X1) and test data (X2) have on the classification. Looking at the outer loop, the influence of the test examples is slowly increased until  $C_2$  is reached. The choice of  $C_2$  therefore limits the influence of the test examples while  $C_1$  stays constant and helps with the initial labeling of the test data based on the inductive SVM classification.

One could choose the parameters using cross-validation and optimizing for precision and recall the classifier achieves.

### 2.c

It is called *reproducing* because there exists a unique function such that we can retrieve our mapping  $\phi$  by forming the inner product. We can therefore "reproduce" the transformation for linear separability.