9.6.4 SVM with Multiple Classes

Set up Support Vector Machine

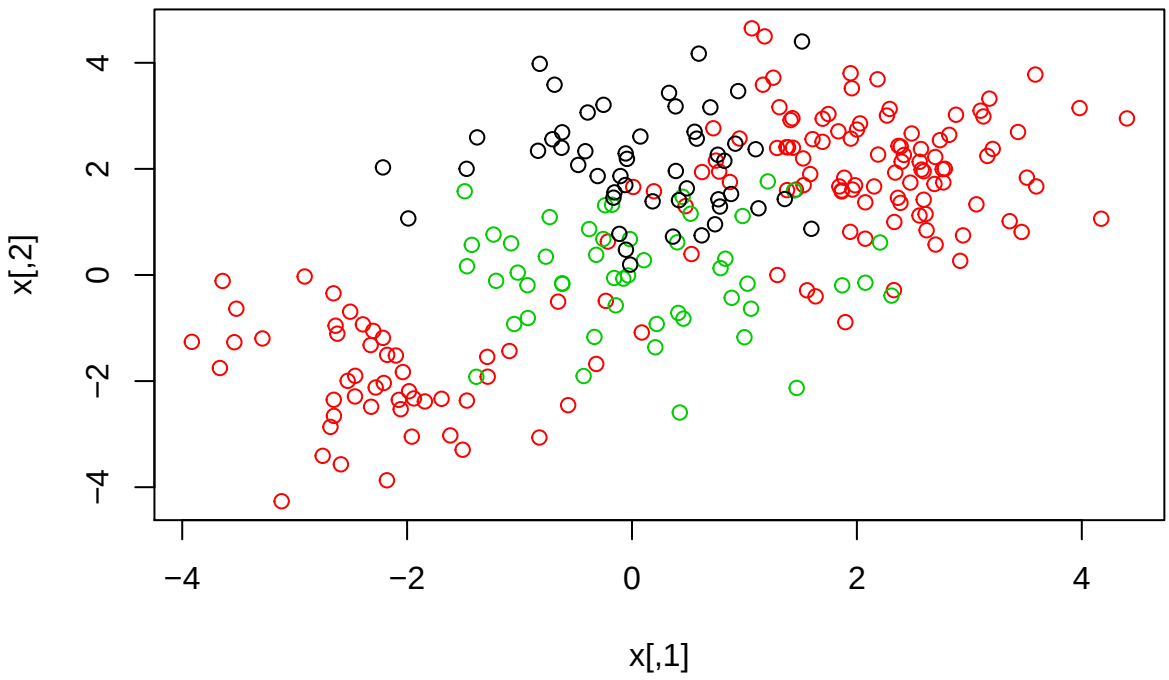
- Factor the data frame
- Create a train set

```
library(e1071)
set.seed(1)
x=matrix(rnorm(200*2), ncol=2)
x[1:100,]=x[1:100,]+2
x[101:150,]=x[101:150,]-2
y=c(rep(1,150),rep(2,50))
dat=data.frame(x=x,y=as.factor(y))
train=sample(200,100)
```

This is where 9.6.4 really starts, but you need the other inputs to run the following code.

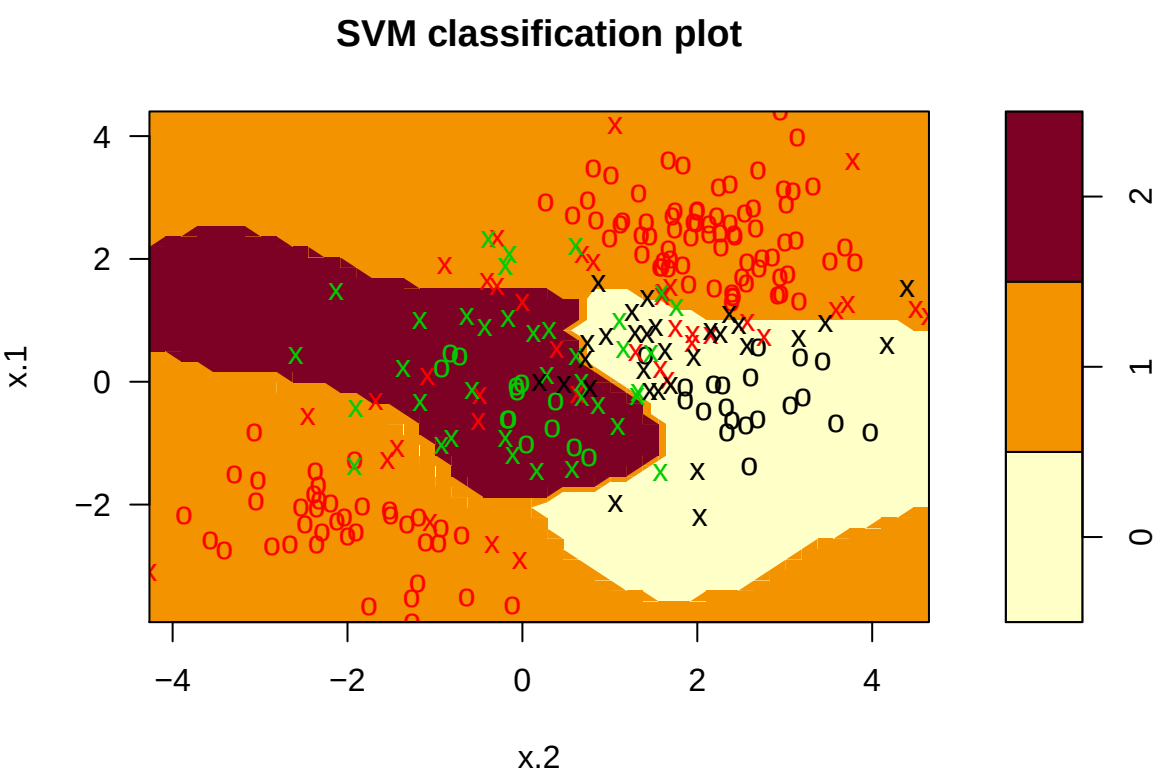
If the response is a factor containing more than two levels, then the svm() function will perform multi-class classification using the one-versus-one approach.

```
set.seed(1)
x=rbind(x, matrix(rnorm(50*2), ncol=2))
y=c(y, rep(0,50))
x[y==0,2]=x[y==0,2]+2
dat=data.frame(x=x, y=as.factor(y))
par(mfrow=c(1,1))
plot(x,col=(y+1))
```



We now fit an SVM to the data:

```
svmfit=svm(y~., data=dat, kernel="radial", cost=10, gamma=1)
plot(svmfit, dat)
```


SVM classification plot
x.1
x.2
4
2
0
−2
−4
−2
0
2
4
2
1
0