# Stats 202A
# Assignment 6

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## Performance Evaluation

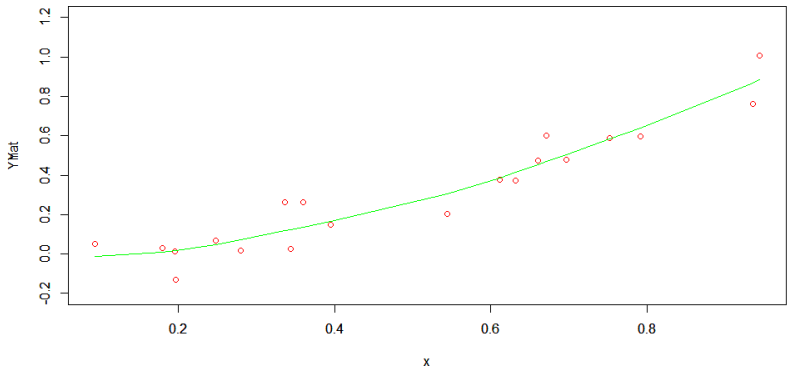
### Parameters

```
n = 20
p = 500
lambda = 1
```

### Sweep using R

Output:

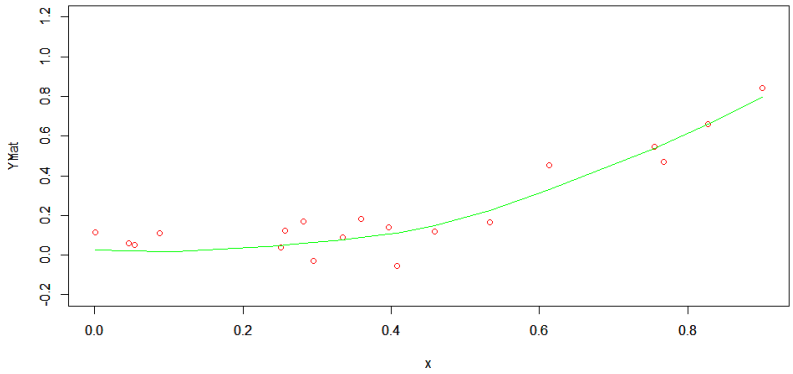
```
[1] "R"
Time difference of 4.942058 mins
```




### Sweep Using RCPP

Output:

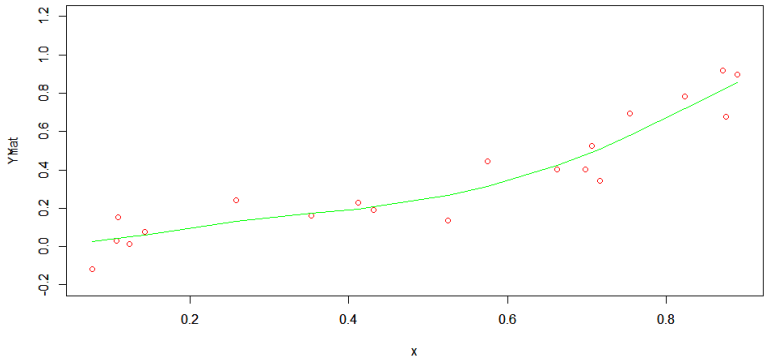
```
[1] "RCPP"
Time difference of 0.368597 secs
```




## QR using R

### Output:

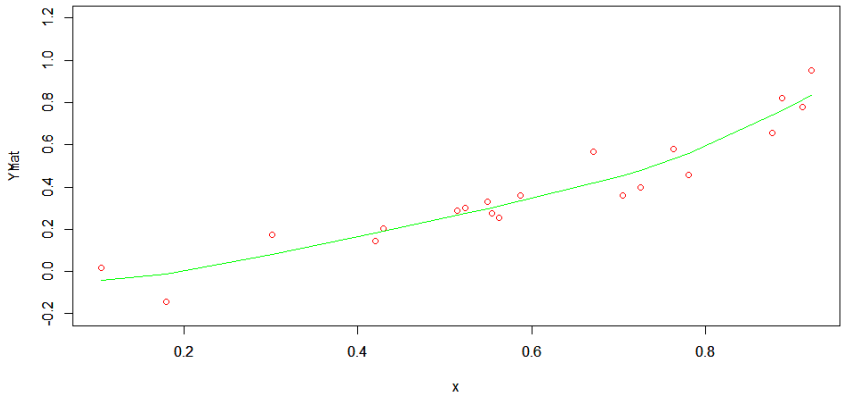
```
[1] "R"
Time difference of 2.542975 secs
```




## QR using RCPP

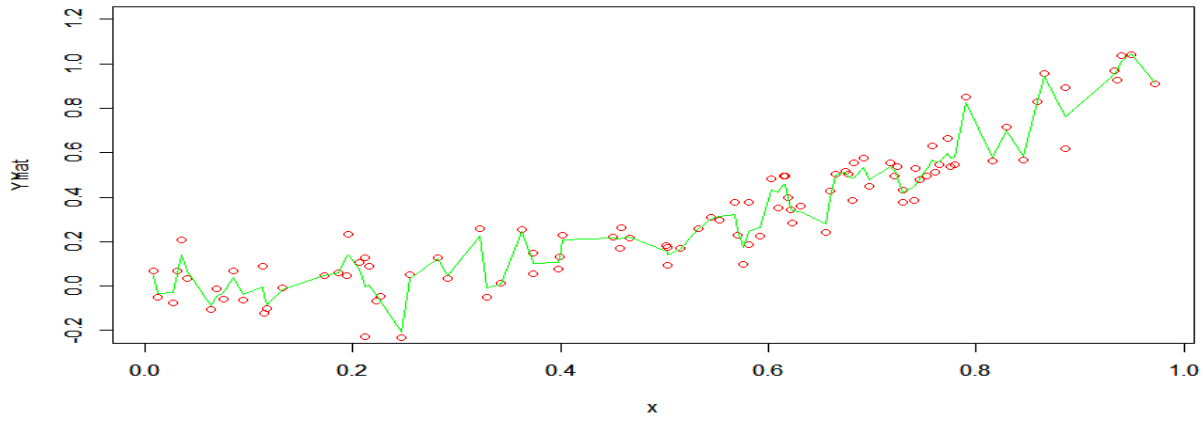
### Output:

```
[1] "RCPP"
Time difference of 1.282547 secs
```

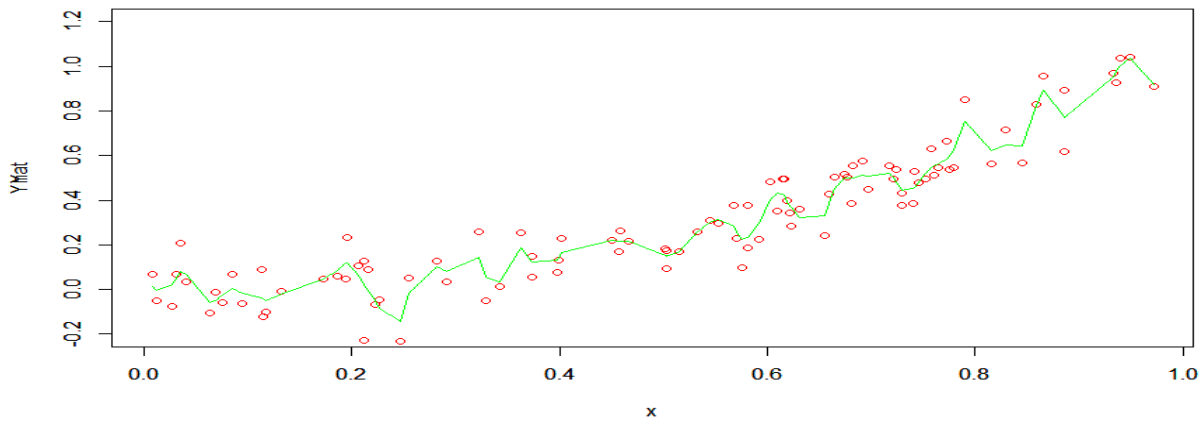



## Plots of learned spline curves for different values of lambda

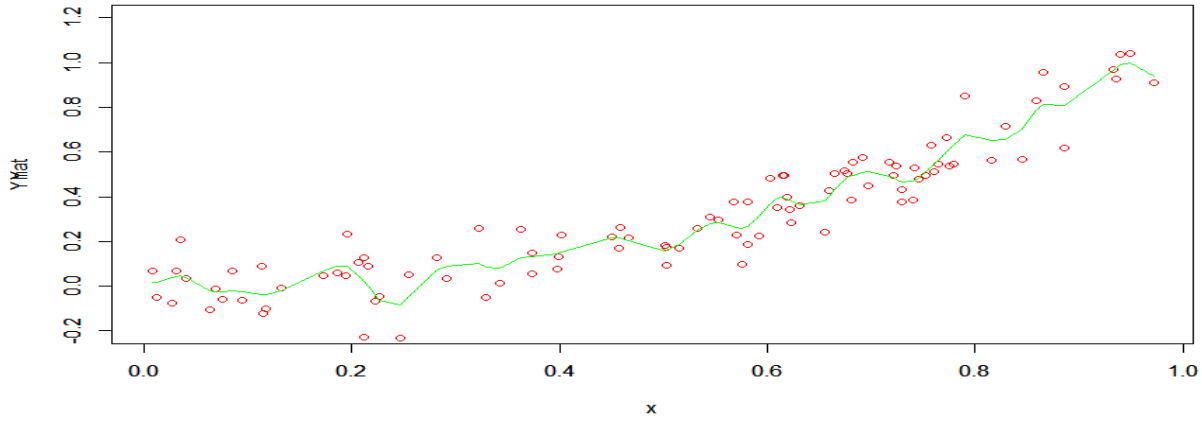
Lambda = 0.00001



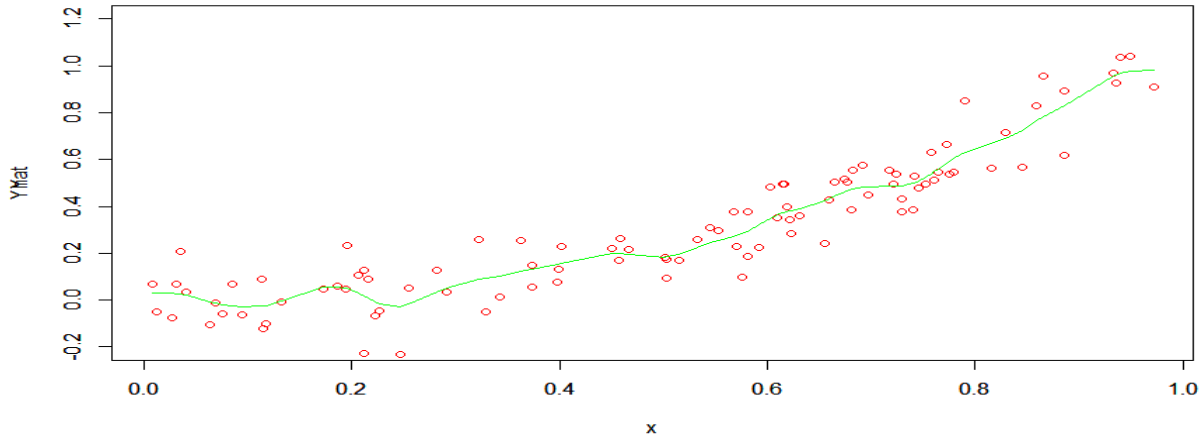
Lambda = 0.0001



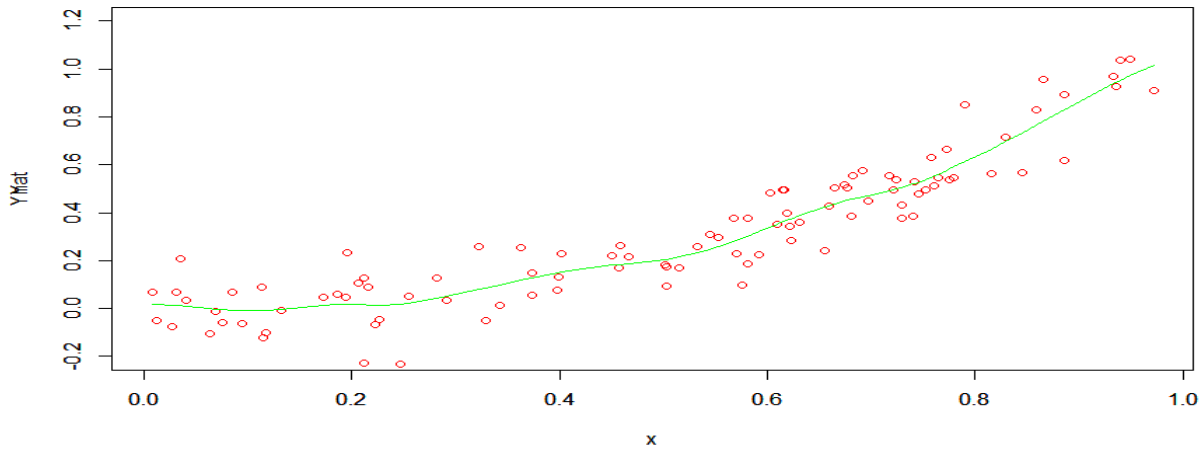

Lambda = 0.001



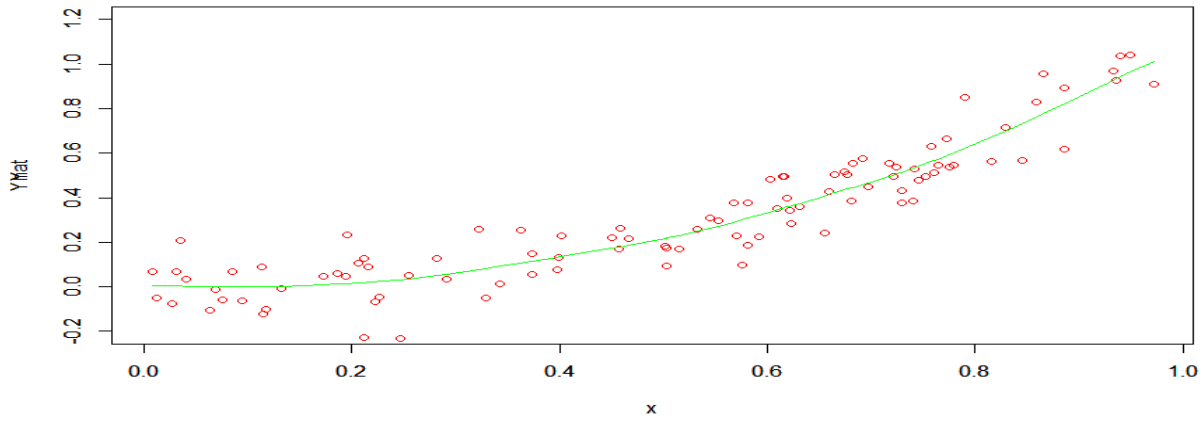

Lambda = 0.01



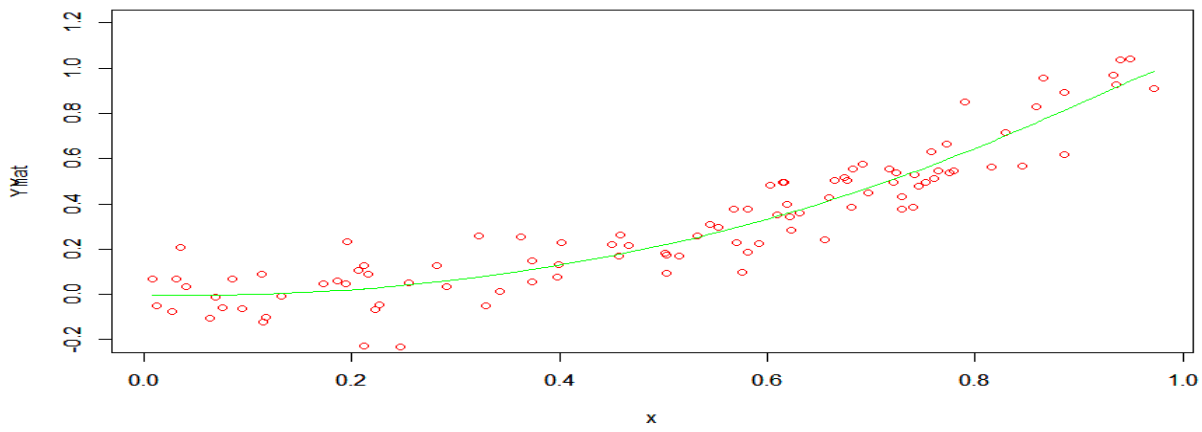
Lambda = 0.1



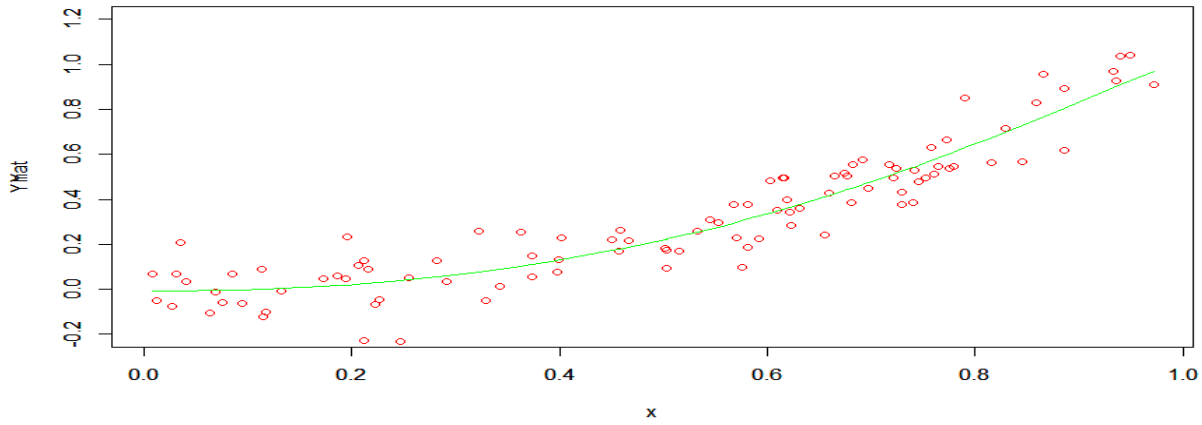

Lambda = 1



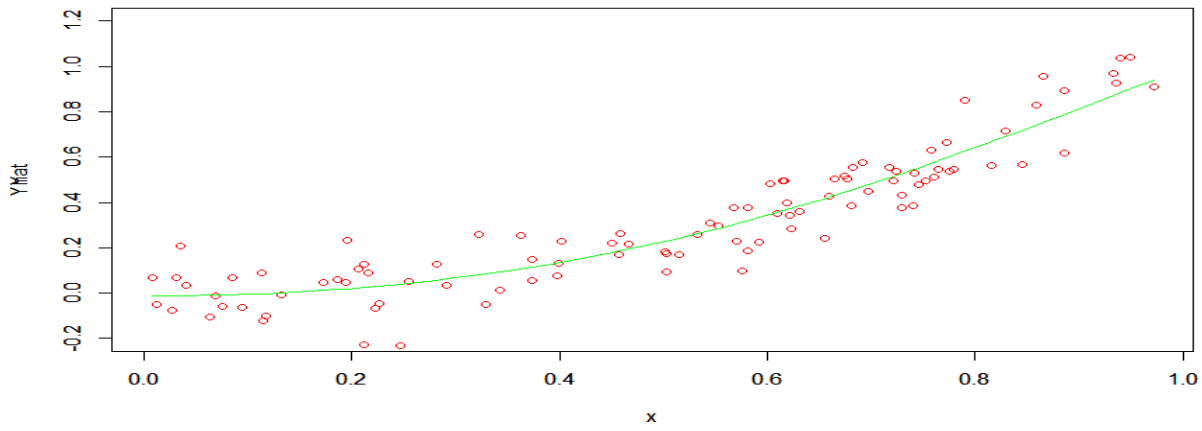
Lambda = 5



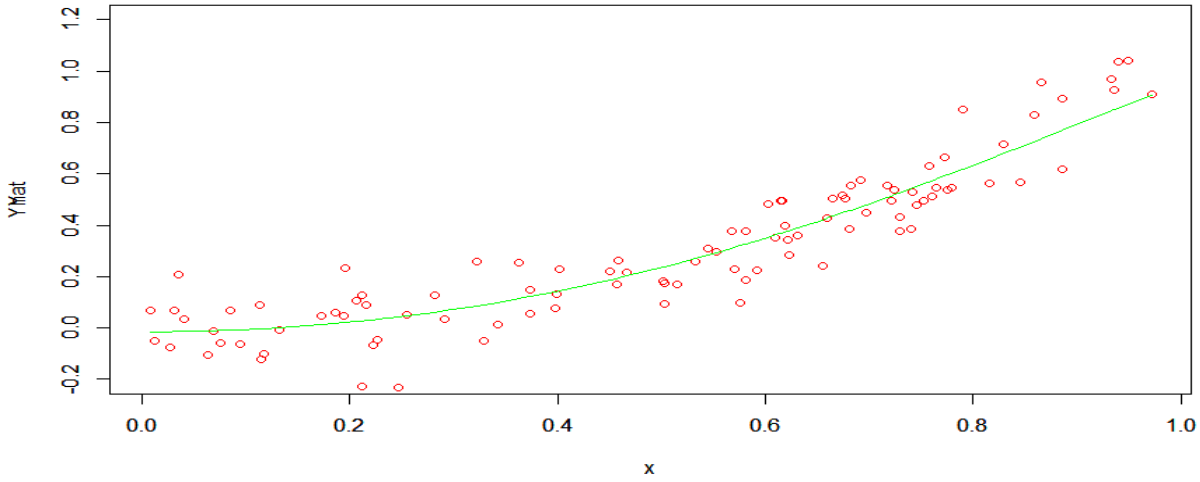

Lambda = 10



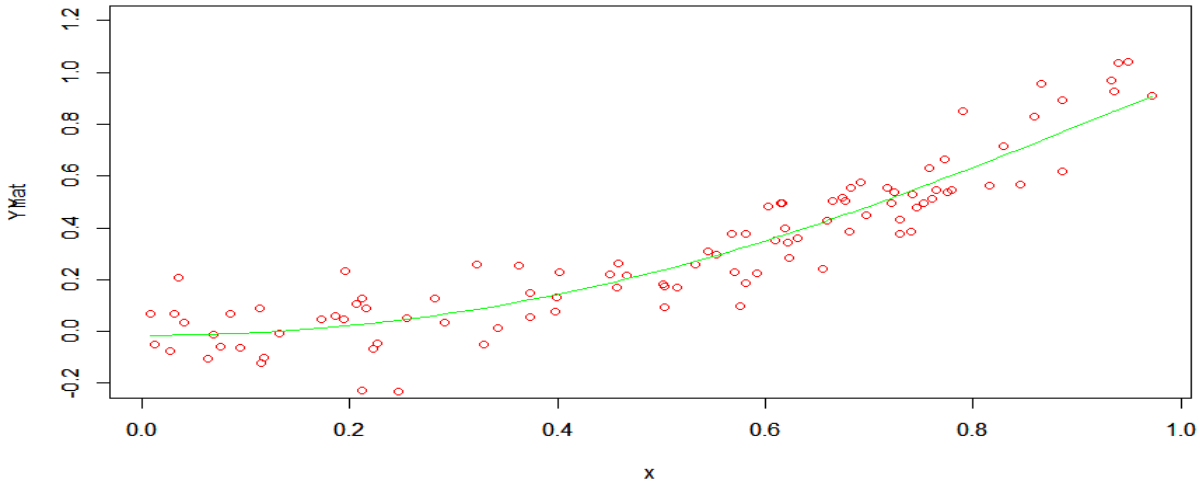

Lambda = 25



Lambda = 50

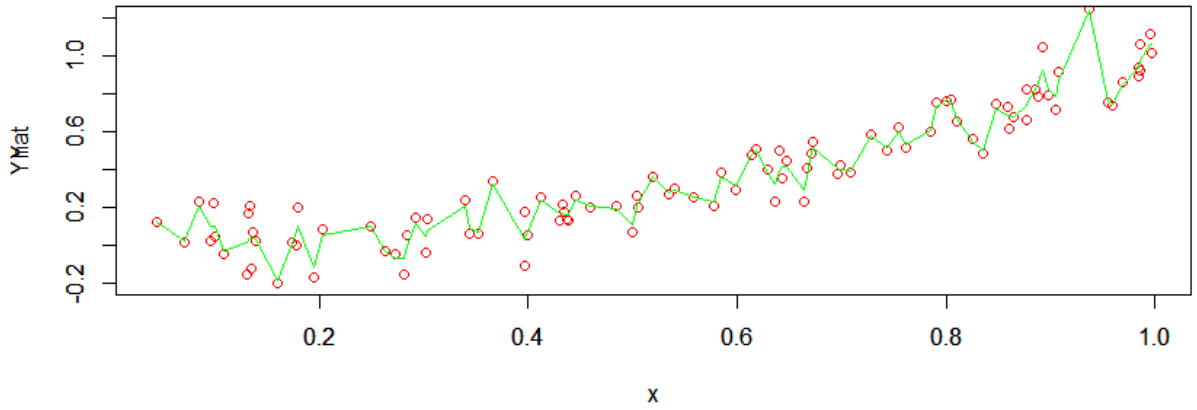



Lambda = 100

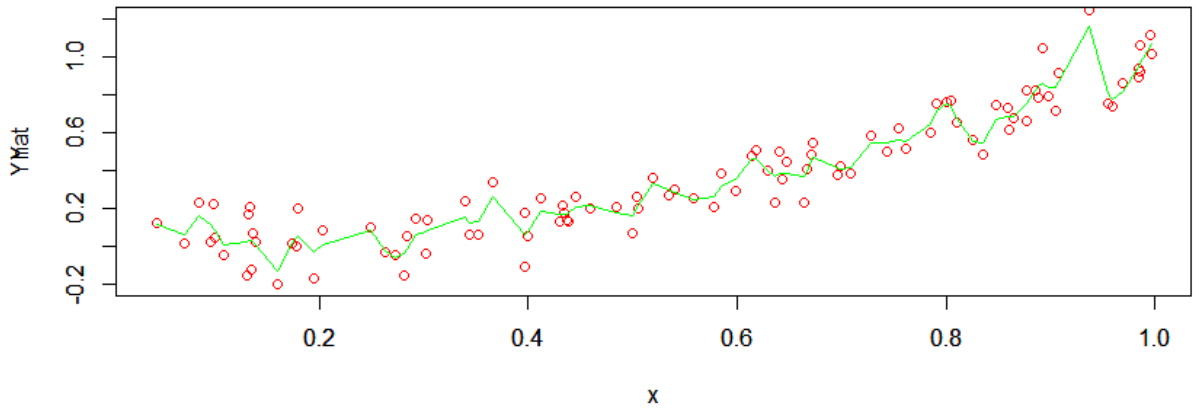


## Plots of learned ridge curves for different values of lambda

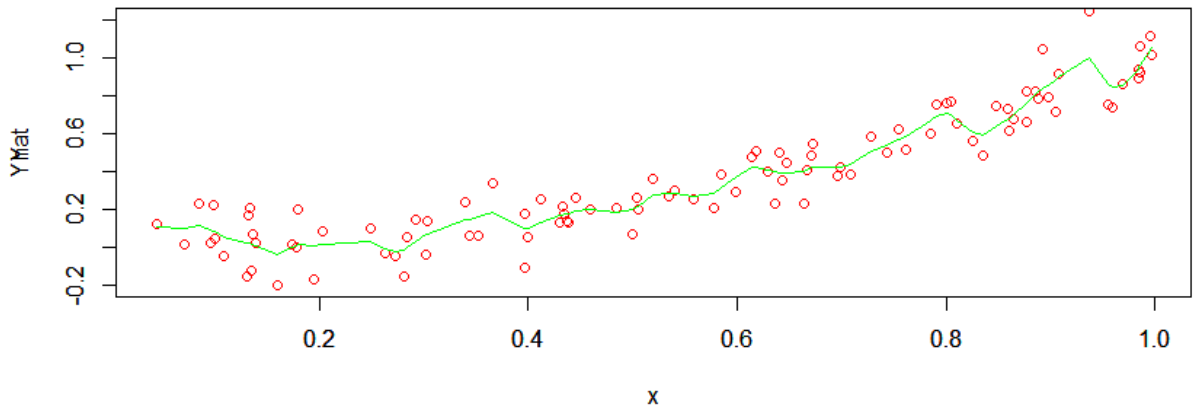
Lambda = 0.00001



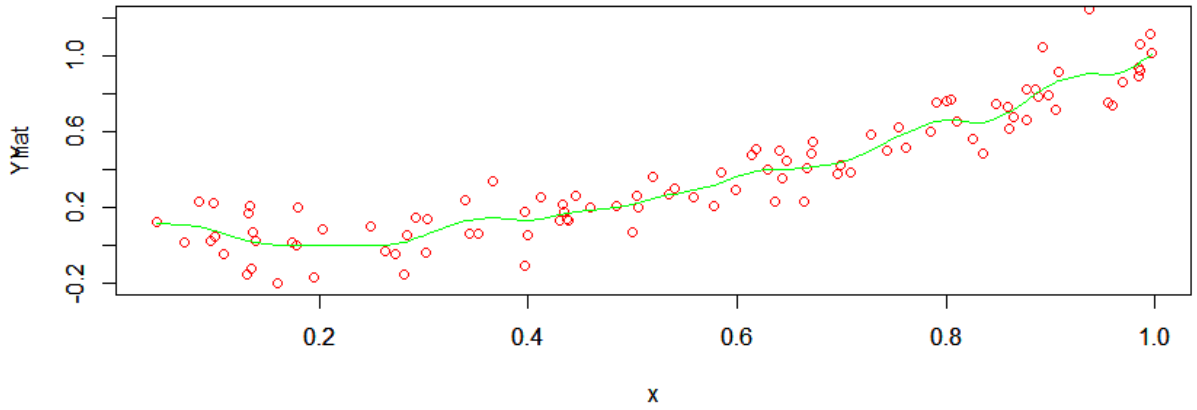

Lambda = 0.0001



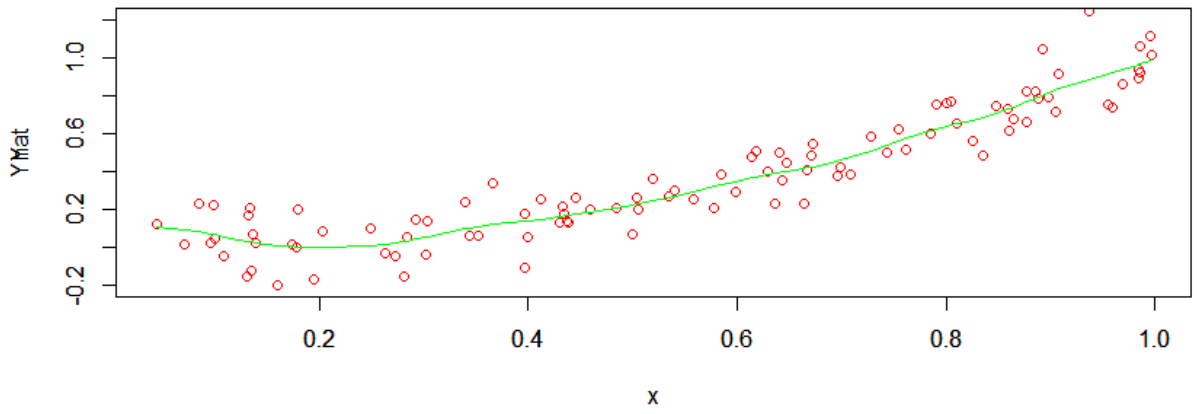
Lambda = 0.001



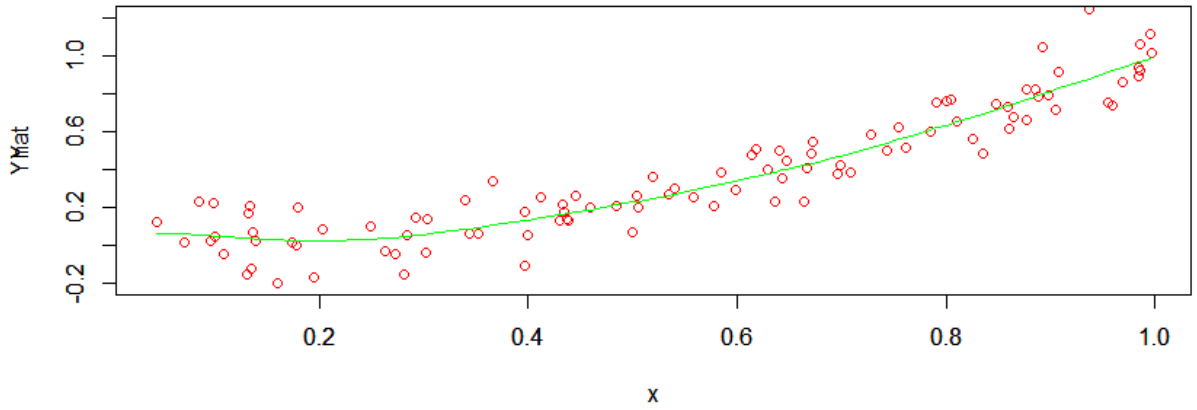

Lambda = 0.01



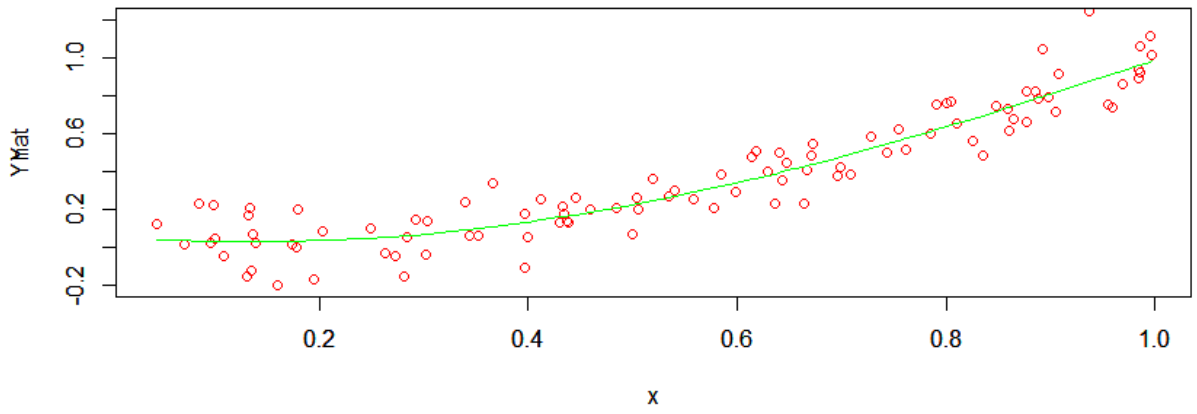
Lambda = 0.1



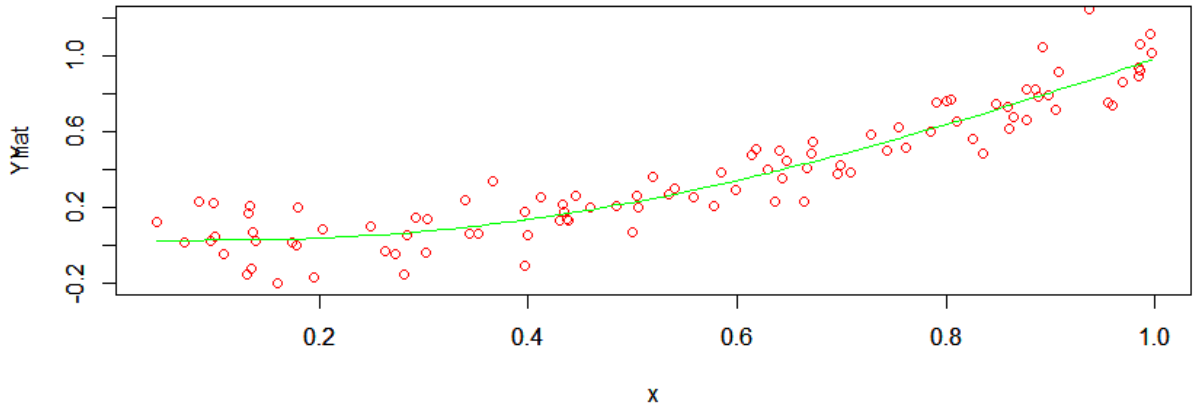

Lambda = 1



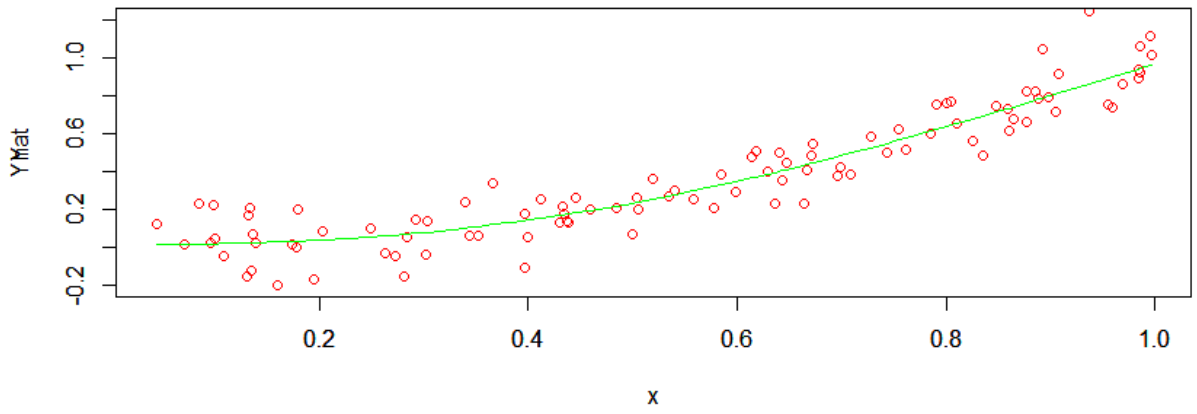
Lambda = 5



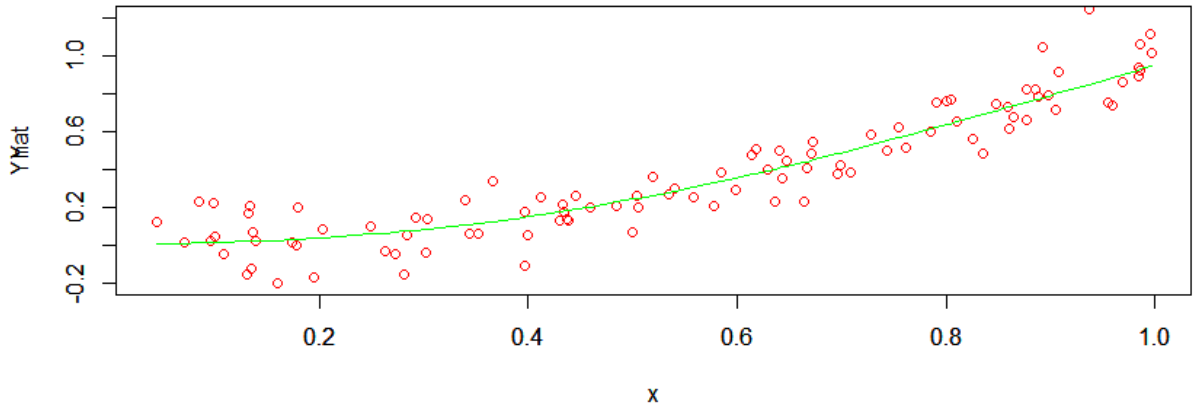

Lambda = 10



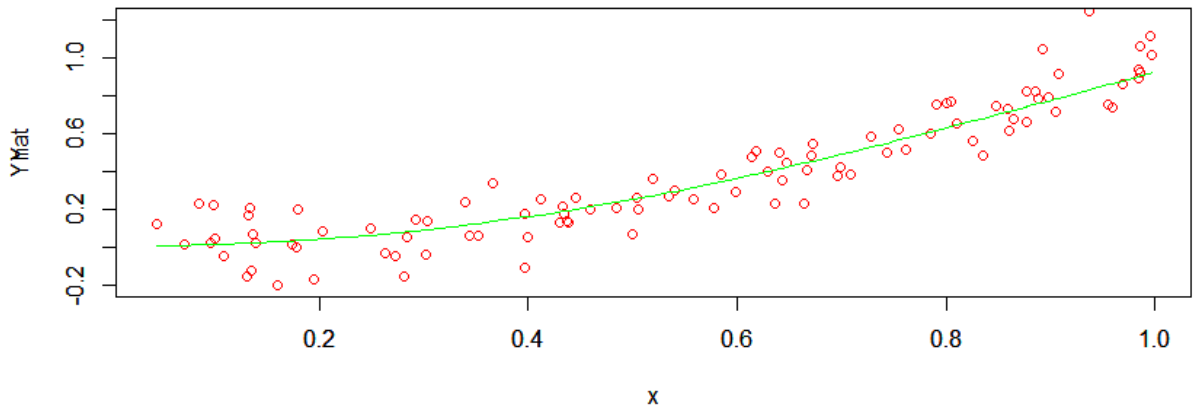
Lambda = 25



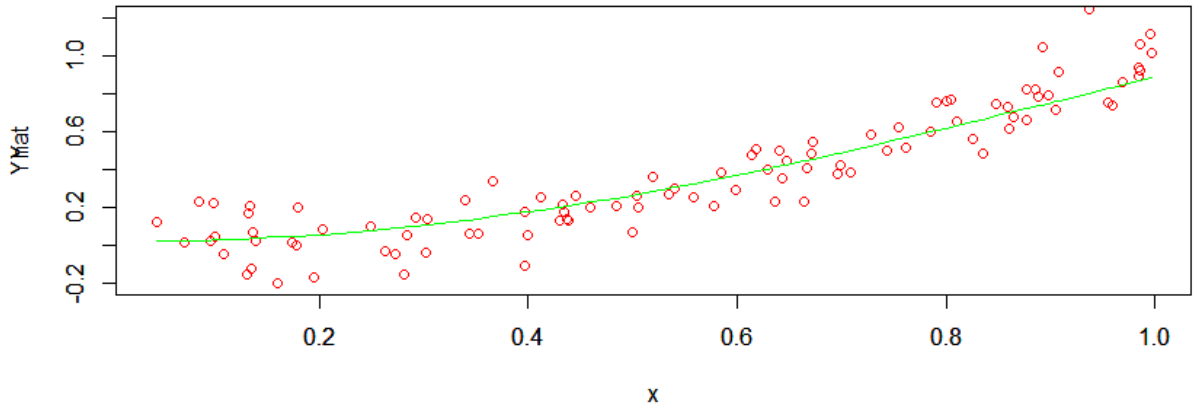

Lambda = 50



Lambda = 100



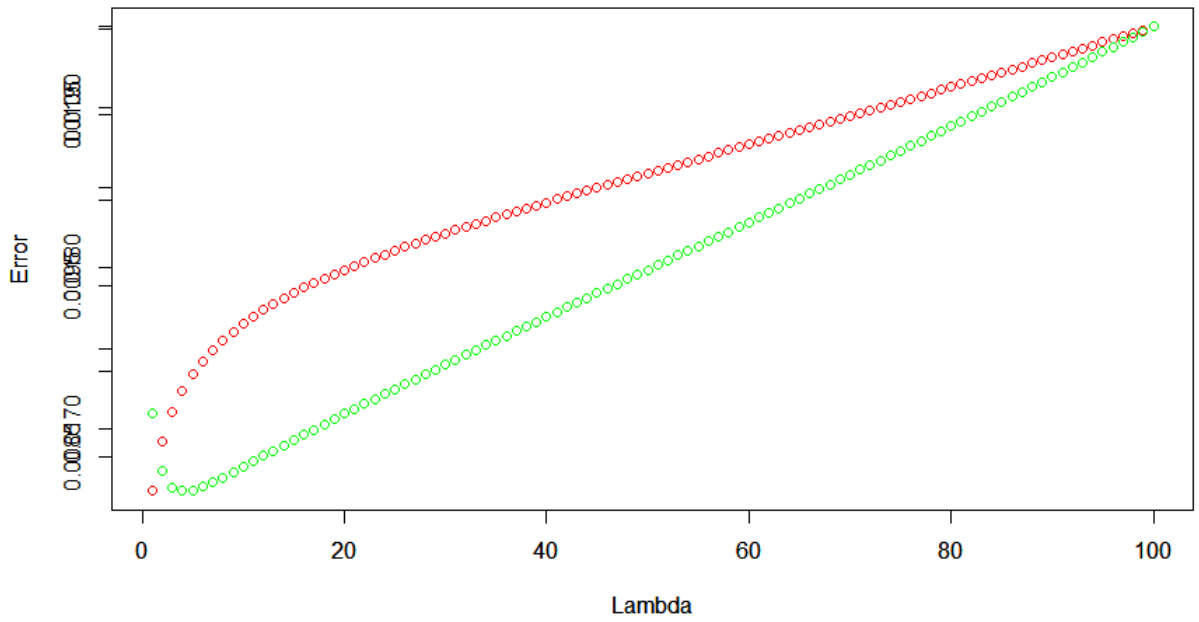

Lambda = 200



# Training and Testing Plots for Spline Curve

## Parameters

```
n = 50
p = 1000
```




**Green** = Testing Error

**Red** = Training Error

When the value of Lambda is low, the model is overfitting the data and hence the value of training error is low. Later, the model improves. With large values of Lambda, the training and testing error increases due to underfitting.