Assignment 3 report

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RH-SVR

For all tests: Train- Test split = 7:3

Test 1: Variation in C

Epsilon = 0.5
C=0.1

MSE on test set = 23.479355
MSE on train set = 28.387298

Epsilon = 0.5
C=1

MSE on test set = 22.1770341
MSE on train set = 25.564534

Epsilon = 0.5
C= 10

MSE on test set = 22.6906088
MSE on train set = 26.015481

Test 2: Variation in Epsilon

Epsilon = 0.5
C= 10

MSE on test set = 22.6906088

MSE on train set = 26.015481

Epsilon = 1
C=10

MSE on test set = 20.542995
MSE on train set = 23.82857

Epsilon = 1.5
C=10

MSE on test set =21.470884
MSE on train set = 24.505139

Test 3: Variation in kernels

Epsilon = 2
C=1
Kernel = poly degree 3

MSE on test set=53.16228
MSE on train set=2.08201

Epsilon = 2
C=1
Kernel = poly degree 2

MSE on test set =11.02307
MSE on train set =7.75562

Epsilon = 2
C=1
Kernel = gaussian sigma=5

MSE on test set=18.953763
MSE on train set=19.863129

Epsilon = 2
C=1
Kernel = gaussian sigma=13

MSE on test set=30.707324
MSE on train set=32.85159

Epsilon-SVR

For all tests: Train- Test split = 7:3

Test 1:Comparison with sklearn:

For all tests c=1,epsilon = 2

Linear kernel

Sklearn linear epsilon svr:

MSE on test samples= 19.812733
MSE on train samples= 25.916713

My implementation using cvxopt:

MSE on test samples =19.81183
MSE on train samples =25.91619

Polynomial kernel degree 2

Sklearn polynomial degree 2 epsilon svr:

MSE on test samples= 47.1983025
MSE on train samples= 44.9118826

My implementation using cvxopt:

MSE on test samples = 9.637487
MSE on train samples = 6.8109

RBF kernel

Sklearn rbf epsilon svr:

MSE on test samples= 15.067921
MSE on train samples= 31.1277

My implementation using cvxopt:

MSE on test samples =31.59203
MSE on train samples =32.60831

Test 2: Comparison with RH-SVR

For all tests c=1,epsilon = 2

Linear kernel

RHSVR
MSE on test set=22.4367
MSE on train set=25.1624

Epsilon SVR
MSE on test samples =19.81183
MSE on train samples =25.91619

Polynomial kernel degree 2

RHSVR
MSE on test set =11.02307
MSE on train set =7.75562

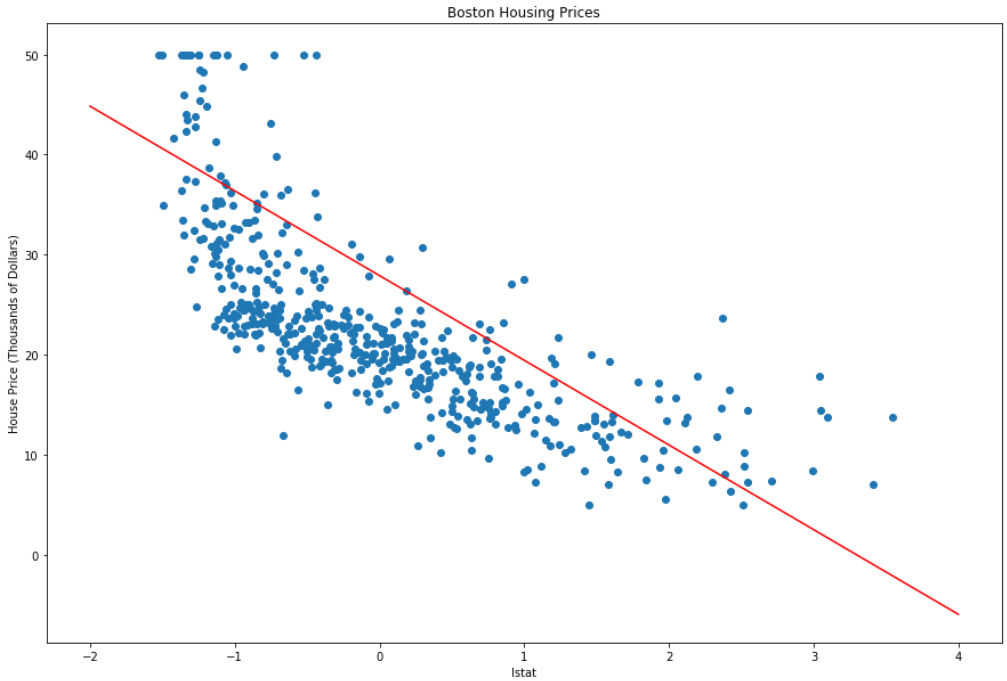
Epsilon SVR
MSE on test samples = 9.637487
MSE on train samples = 6.8109

RBF kernel sigma=5

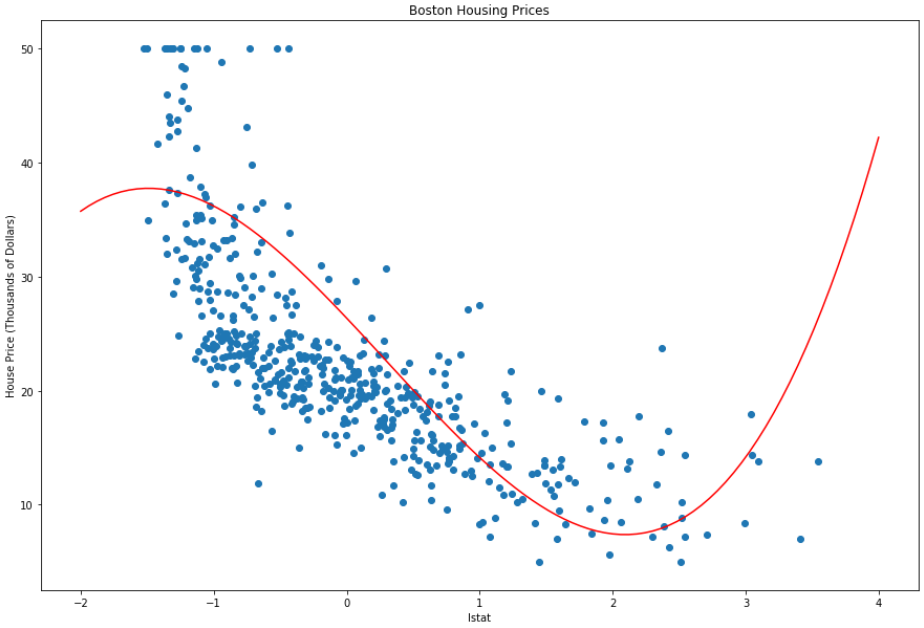
RHSVR
MSE on test set=18.953763
MSE on train set=19.863129

Epsilon SVR
MSE on test samples =31.59203
MSE on train samples =32.60831

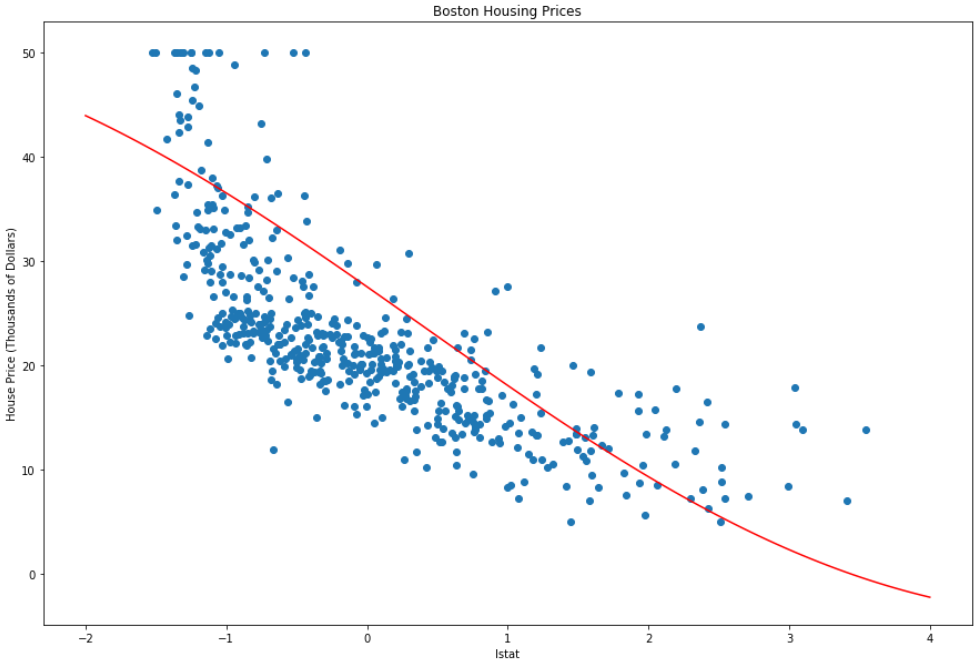
Graphs of RHSVR using a single feature (lstat) for different kernels



Linear kernel



Polynomial kernel degree 3



RBF sigma=5