REPORT FOR PART-3

Values of parameters and errors for which we got maximum training error in part-2 (i.e when we use degree1) using RIDGE REGRESSION :

Lamda =(0.25):

a[0]: 0.9165294589634312
a[1]: -1.8555802947333364\

Train error = [0.09968031]
Test error = [0.09553497]

Lamda =(0.5):

a[0]: 0.9138219452417189
a[1]: -1.850385431197897

Train error = [0.09968392]
Test error = [0.09550858]

Lamda =(0.75):

a[0]: 0.9111295489807647
a[1]: -1.845219573303543

Train error = [0.09968988]
Test error = [0.09548461]

Lamda =(1):

a[0]: 0.908452143923088
a[1]: -1.8400824788015666

Train error = [0.09969816]
Test error = [0.09546303]

Values of parameters and errors for which we got maximum training error in part-2 (i.e when we use degree1) using LASSO REGRESSION :

Lamda: (0.25):

a[0]: 0.9180112040161289
a[1]: -1.8586631260934774

Train error = [0.09967931]
Test error = [0.09555044]

Lamda: (0.5):

a[0]: 0.9167701547975075
a[1]: -1.8565217802953153

Train error = [0.09967994]
Test error = [0.09553745]

Lamda: (0.75):

a[0]: 0.915529105578823
a[1]: -1.854380434497036

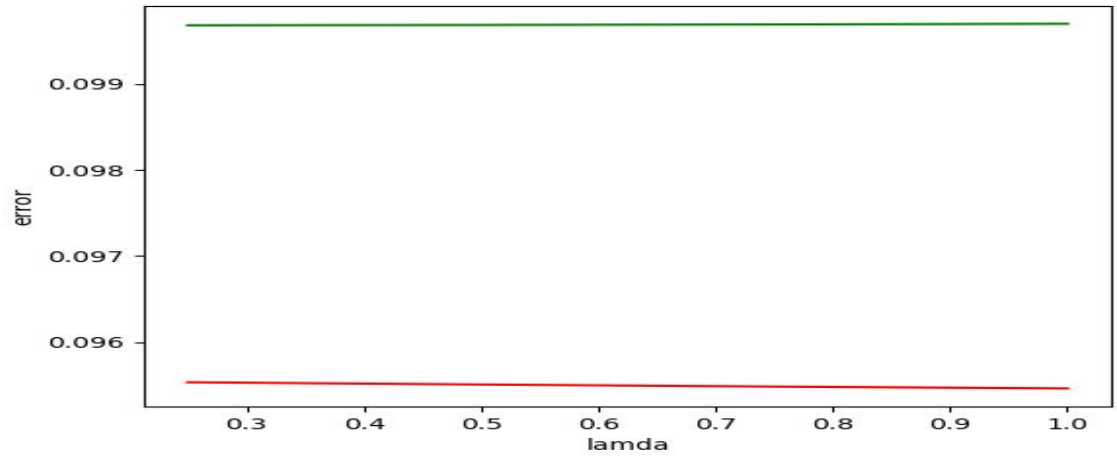
Train error = [0.099681]
Test error = [0.09552489]

Lamda: (1):

a[0]: 0.9142880563601914
a[1]: -1.8522390886988558

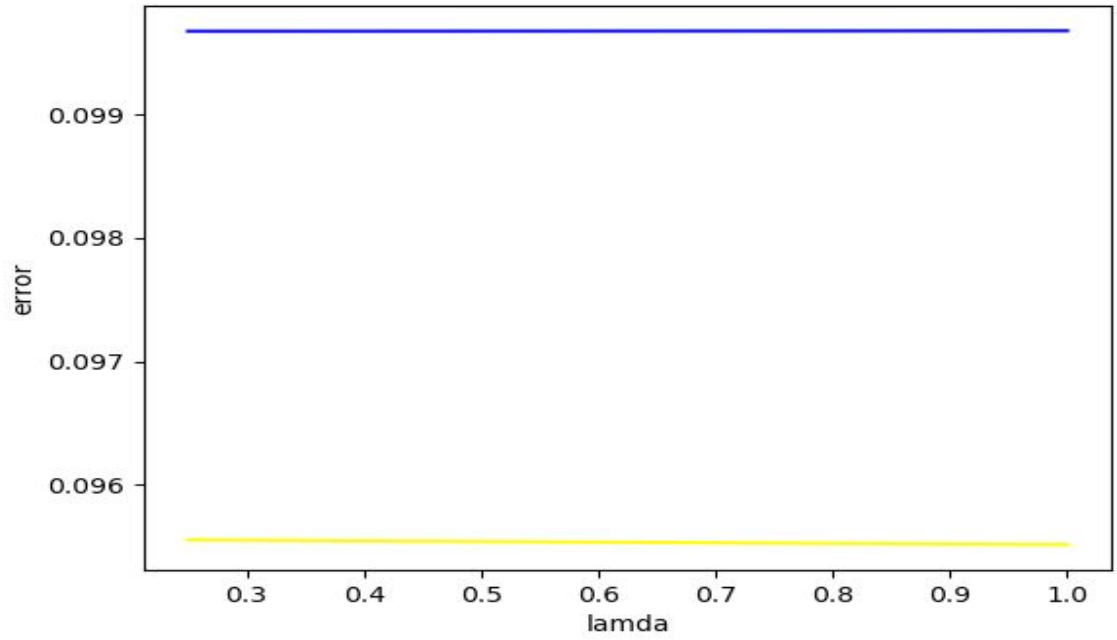
Train error = [0.09968248]
Test error = [0.09551274]

The plot of (training error and test error) vs (lambda) values[Ridge regression with degree 1]:



Green ---- >Training error
Red ---- >Test error

The plot of (training error and test error) vs (lambda) values[Lasso regression with degree 1]:



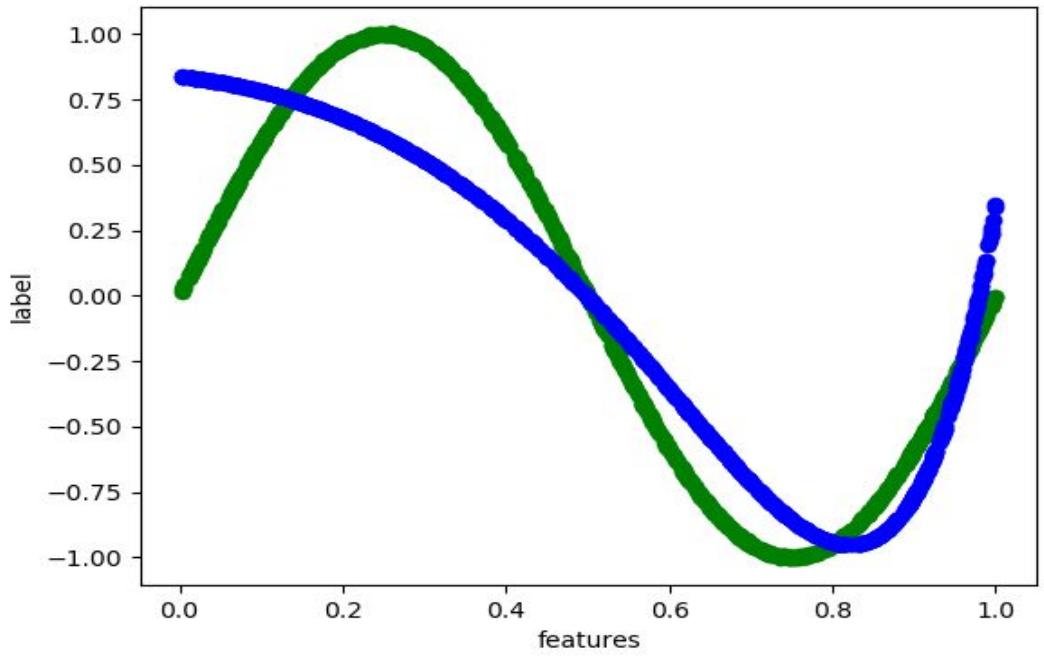
Blue ----->Training error
yellow ----->Test error

Values of parameters and errors for which we got minimum training error in part-2 (i.e when we use degree 9) using RIDGE REGRESSION :

Lamda: (0.5) :

a[0]: 0.8386917472515527
a[1]: -0.3667783167968484
a[2]: -1.8734983492316946
a[3]: -1.4223151791762014
a[4]: -0.6238020995232759
a[5]: 0.05921961799339056
a[6]: 0.5527805754074486
a[7]: 0.8825320294386259
a[8]: 1.0900272785918428
a[9]: 1.2113893525633568

Train error = [0.03793316]
Test error = [0.04032649]

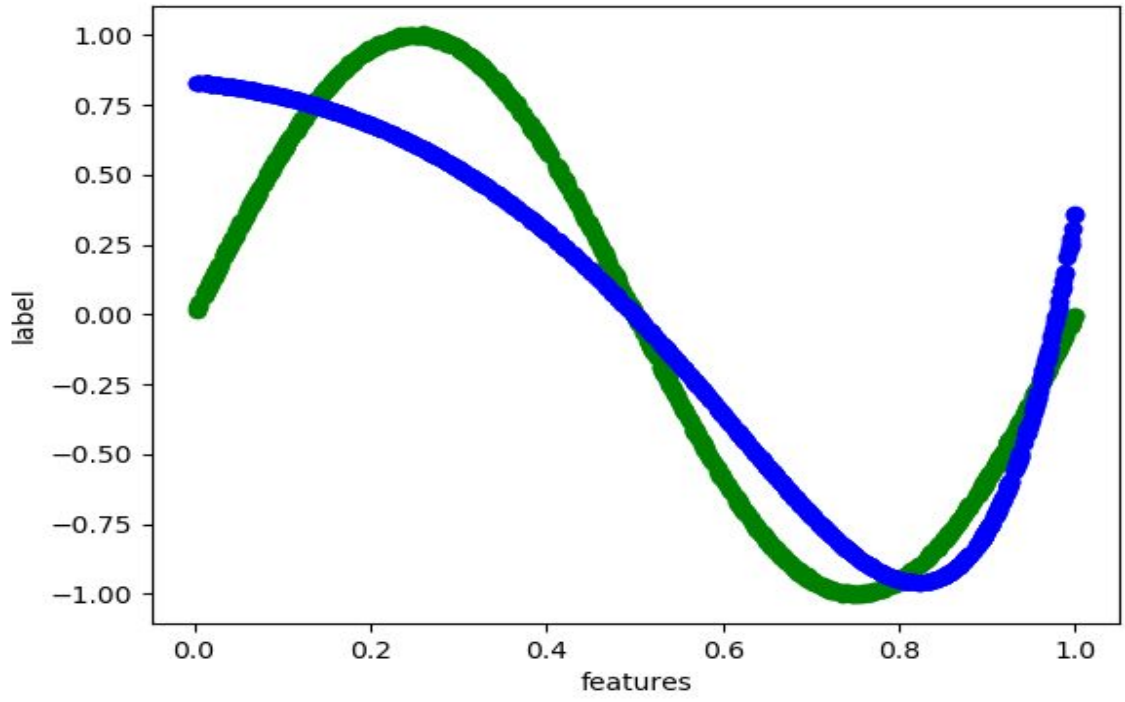


Values of parameters and errors for which we got minimum training error in part-2 (i.e when we use degree 9) LASSO REGRESSION :

Lambda: (0.5):

a[0]: 0.8317858501286864
a[1]: -0.3125931489713081
a[2]: -1.9314085425171257
a[3]: -1.449623883544901
a[4]: -0.5960340874040151
a[5]: 0.020897789755649158
a[6]: 0.5401788372313011
a[7]: 0.8942504893075109
a[8]: 1.1178027670697586
a[9]: 1.249350626011543

Train error = [0.03743628]
Test error = [0.03980872]



- The difference observed in two types of regressions is when we observe the difference of train error and test error we get less difference in the case of Lasso regression than Ridge regression.
- We would like to prefer Lasso regression over ridge regression as we are getting less difference in errors.