

ASM Practice

Ridge Regression

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1. Ridge regression lambda search

```
##      lambda      mspe      df
## 1  1e-03   -40.22012  17.002895
## 2  1e-02   -40.06979  17.029362
## 3  1e-01   -38.25343  17.343336
## 4  1e+00   9739.29149  45.182467
## 5  1e+01    57.51100  15.237836
## 6  1e+02  17796.45787   7.066805
```

2. Ridge regression lambda search with CV

```
##      lambda      mspe      df
## 1  1e-03 -2.384440e-01  17.00219
## 2  1e-02  3.683957e-01  17.02213
## 3  1e-01  1.279470e+00  17.24786
## 4  1e+00  1.751914e+02  16.53875
## 5  1e+01  7.772698e+01  15.15629
## 6  1e+02  3.160189e+08  243.50770
```

3. Prostate data application

```
## With validtion data of size 30 instances.
```

```
##      lambda      mspe      df
## 1  1e-03   -0.6122387  8.000239
## 2  1e-02   -0.6007336  8.002395
## 3  1e-01   -0.4841834  8.024134
## 4  1e+00    0.8574859  8.262460
## 5  1e+01  110.6731962  5.453862
## 6  1e+02  173.9801435  3.476492
```

```
## With 5-fold and 10-fold Cross Validation respectively.
```

```
##      lambda      mspe      df
## 1  1e-03    0.05865207  8.000268
## 2  1e-02   -0.04254947  8.002686
## 3  1e-01    0.29067601  8.027126
## 4  1e+00    1.75163008  8.297433
## 5  1e+01  103.63799306  7.859656
## 6  1e+02  207.78337133  4.629682
```

```
##      lambda      mspe      df
## 1  1e-03    0.13358722  8.000268
## 2  1e-02   -0.05631323  8.002682
## 3  1e-01    0.17045159  8.027100
## 4  1e+00    1.67505673  8.299049
## 5  1e+01  108.77734981  7.984772
## 6  1e+02  200.95189917  4.629607
```

With LOOCV (from n-CV and estimate) and GCV estimate respectively.

##	lambda	mspe	df
## 1	1e-03	6.800613e-03	8.000241
## 2	1e-02	1.877704e-02	8.002413
## 3	1e-01	1.400917e-01	8.024318
## 4	1e+00	1.534861e+00	8.264716
## 5	1e+01	1.054999e+02	5.655270
## 6	1e+02	1.730275e+02	3.486334

##	lambda	loocv	gcv	df
## 1	1e-03	0.5294574	0.5274064	8.000238
## 2	1e-02	0.5294800	0.5274320	8.002385
## 3	1e-01	0.5297180	0.5276991	8.024036
## 4	1e+00	0.5335944	0.5317956	8.261352
## 5	1e+01	1.7114692	1.7387329	5.378778
## 6	1e+02	2.3716049	2.2868074	3.362585