STAT 8330 FALL 2015 ASSIGNMENT 3

Peng Shao

September 22, 2015

▶ **Exercises 5.8. Solution.**

(a). The code for spliting data is list at the end of this assignment.

(b). The MSE for linear regression model is 1.1085313×10^6.

(c). The MSE for ridge regression model is 1.0545268×10^6.

(d). The MSE for lasso regression model is 1.0395033×10^6, and the number of non-zero coefficient estimates is 13.

(e). The MSE for PCR model is 1.3256164×10^6, and $M = 16$.

(f). The MSE for PLS model is 1.2799224×10^6, and $M = 16$.

(g). 1.497846×10^7

▶ **Exercises 2. Solution.**

(a). The code for spliting data is list at the end of this assignment

(b). The MSE for linear regression model is 59.3651103.

(c). Results for best subset selection are listed below.

```
## $`Number of Variables`
## [1] 3
##
## $`Name of Variables`
## [1] "(Intercept)" "rad"         "lstat"
##
## $`Coefficients of Variables`
## (Intercept)         rad       lstat
##  -3.7604819   0.4750033   0.2041807
##
## $MSE
## [1] 55.89099
```

(d). Results for ridge regression are listed below.

```
## $Lambda
## [1] 0.5412185
##
## $MSE
## [1] 58.24609
```

(e). Results for lasso regression are listed below.

```
## $Lambda
## [1] 0.2512114
##
## $MSE
## [1] 56.26698
##
## $`Non-zero Coefficient Estimates`
```

```
##  (Intercept)           zn           rm          dis          rad
## -4.102999495  0.008212353  0.736684216 -0.177832783  0.430151095
##        lstat         medv
##  0.129211862 -0.104816617
##
## $`Name of Variables with Zero Coefficient Estimates`
## [1] "indus"   "chas"    "nox"     "age"     "tax"     "ptratio" "black"
```

(f). The MSE for PCR model is 59.3651103, and $M = 13$.

(g). The MSE for PLS model is 59.2842902, and $M = 9$.

(h).

▶ **Exercises 3. Solution.**

```
## $`standard deviation of 'log_area'`
## [1] 1.398436
##
## $lm.mse
## [1] 2.226952
##
## $ridge.mse
## [1] 1.928217
##
## $lasso.mse
## [1] 1.930522
##
## $pcr.mse
## [1] NA
##
## $plsr.mse
## [1] 2.138786
```