mtcars - Stepwise Variable Selection Procedures

Backward Selection

```
attach(mtcars)
FitAll = lm(mpg ~ cyl + disp + hp + drat + wt + qsec + vs +
am + gear + carb)
step(FitAll, direction = "backward")
```

```
## Start:  AIC=70.9
## mpg ~ cyl + disp + hp + drat + wt + qsec + vs + am +
gear + carb
##
##        Df Sum of Sq RSS  AIC
## - cyl   1      0.08 148 68.9
## - vs    1      0.16 148 68.9
## - carb  1      0.41 148 69.0
## - gear  1      1.35 149 69.2
## - drat  1      1.63 149 69.2
## - disp  1      3.92 151 69.7
## - hp    1      6.84 154 70.3
## - qsec  1      8.86 156 70.8
## <none>               148 70.9
## - am    1     10.55 158 71.1
## - wt    1     27.01 174 74.3
##
## Step:  AIC=68.92
## mpg ~ disp + hp + drat + wt + qsec + vs + am + gear +
carb
##
##        Df Sum of Sq RSS  AIC
## - vs    1      0.27 148 67.0
## - carb  1      0.52 148 67.0
## - gear  1      1.82 149 67.3
## - drat  1      1.98 150 67.3
## - disp  1      3.90 152 67.7
## - hp    1      7.36 155 68.5
## <none>               148 68.9
## - qsec  1     10.09 158 69.0
## - am    1     11.84 159 69.4
## - wt    1     27.03 175 72.3
##
## Step:  AIC=66.97
## mpg ~ disp + hp + drat + wt + qsec + am + gear + carb
##
##        Df Sum of Sq RSS  AIC
## - carb  1      0.69 148 65.1
## - gear  1      2.14 150 65.4
## - drat  1      2.21 150 65.4
## - disp  1      3.65 152 65.8
```

```
## - hp    1      7.11 155 66.5
## <none>              148 67.0
## - am    1     11.57 159 67.4
## - qsec  1     15.68 164 68.2
## - wt    1     27.38 175 70.4
##
## Step:  AIC=65.12
## mpg ~ disp + hp + drat + wt + qsec + am + gear
##
##        Df Sum of Sq RSS  AIC
## - gear  1       1.6 150 63.5
## - drat  1       1.9 150 63.5
## <none>              148 65.1
## - disp  1      10.1 159 65.2
## - am    1      12.3 161 65.7
## - hp    1      14.8 163 66.2
## - qsec  1      26.4 175 68.4
## - wt    1      69.1 218 75.3
##
## Step:  AIC=63.46
## mpg ~ disp + hp + drat + wt + qsec + am
##
##        Df Sum of Sq RSS  AIC
## - drat  1       3.3 153 62.2
## - disp  1       8.5 159 63.2
## <none>              150 63.5
## - hp    1      13.3 163 64.2
## - am    1      20.0 170 65.5
## - qsec  1      25.6 176 66.5
## - wt    1      67.6 218 73.4
##
## Step:  AIC=62.16
## mpg ~ disp + hp + wt + qsec + am
##
##        Df Sum of Sq RSS  AIC
## - disp  1       6.6 160 61.5
## <none>              153 62.2
## - hp    1      12.6 166 62.7
## - qsec  1      26.5 180 65.3
## - am    1      32.2 186 66.3
## - wt    1      69.0 222 72.1
##
## Step:  AIC=61.52
## mpg ~ hp + wt + qsec + am
##
##        Df Sum of Sq RSS  AIC
## - hp    1       9.2 169 61.3
## <none>              160 61.5
## - qsec  1      20.2 180 63.3
## - am    1      26.0 186 64.3
## - wt    1      78.5 239 72.3
##
## Step:  AIC=61.31
## mpg ~ wt + qsec + am
##
##        Df Sum of Sq RSS  AIC
## <none>              169 61.3
## - am    1      26.2 195 63.9
## - qsec  1     109.0 278 75.2
```

```
## - wt    1     183.3 353 82.8
```

```
##
## Call:
## lm(formula = mpg ~ wt + qsec + am)
##
## Coefficients:
## (Intercept)           wt         qsec           am
##        9.62        -3.92         1.23         2.94
```

Forward Selection

```
FitAll = lm(mpg ~ 1)
step(FitAll, direction = "forward")
```

```
## Start:  AIC=115.9
## mpg ~ 1
```

```
##
## Call:
## lm(formula = mpg ~ 1)
##
## Coefficients:
## (Intercept)
##        20.1
```