

Plot Comparison

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Note

Plot Comparison based on plan.

Data & Libs

```
library(tidyverse)
library(broom)
library(gridExtra)

# Traditional Model
lm.1 <- lm(mpg ~ wt,data=mtcars)

# Generic name
My.Mod <- lm.1
# Tidy output
Tidy.Mod <- augment(My.Mod)

# Attributes
class(My.Mod)
```

```
## [1] "lm"
```

```
attributes(My.Mod)
```

```
## $names
## [1] "coefficients" "residuals"      "effects"        "rank"
## [5] "fitted.values" "assign"          "qr"             "df.residual"
## [9] "xlevels"       "call"           "terms"          "model"
##
## $class
## [1] "lm"
```

```
head(Tidy.Mod,4)
```

```
##      .rownames mpg   wt .fitted .se.fit .resid .hat
## 1      Mazda RX4 21.0 2.620 23.28261 0.6335798 -2.2826106 0.04326896
## 2      Mazda RX4 Wag 21.0 2.875 21.91977 0.5714319 -0.9197704 0.03519677
## 3      Datsun 710 22.8 2.320 24.88595 0.7359177 -2.0859521 0.05837573
## 4      Hornet 4 Drive 21.4 3.215 20.10265 0.5384424 1.2973499 0.03125017
##      .sigma .cooksd .std.resid
## 1 3.067494 0.013274072 -0.7661677
## 2 3.093068 0.001723963 -0.3074305
## 3 3.072127 0.015439367 -0.7057525
## 4 3.088268 0.003020558 0.4327511
```

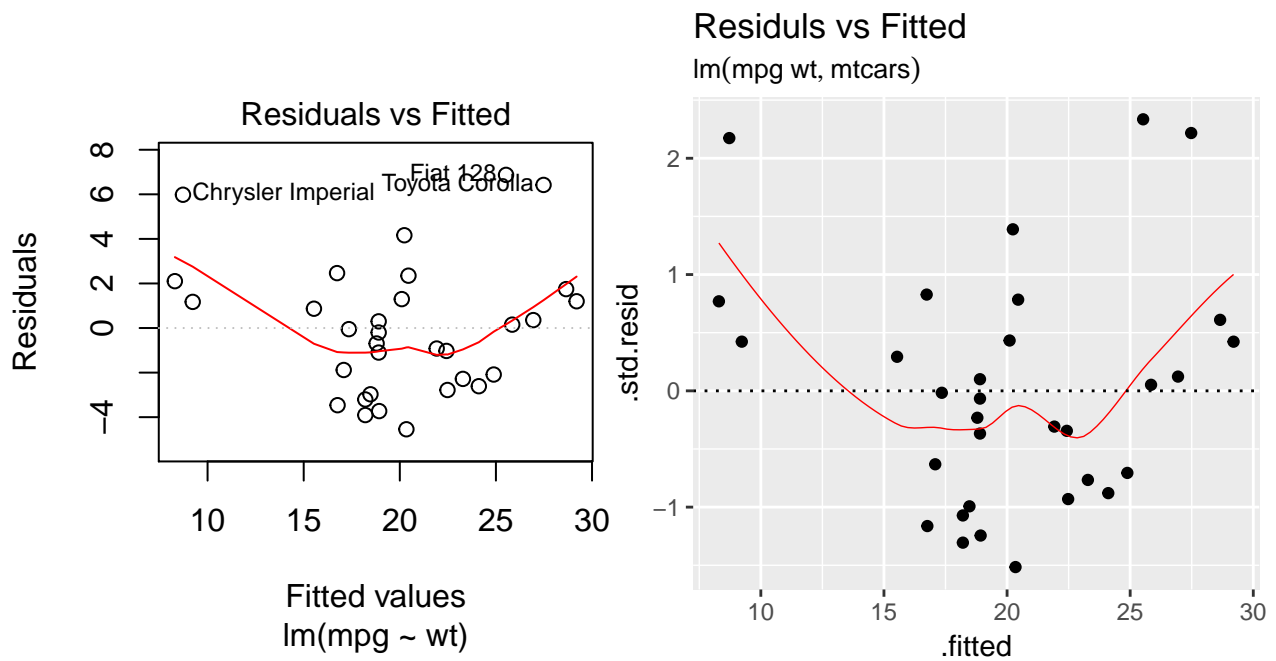
Notes axis scale/ aspect slightly different Text annotations logic ~ highlighting “Wigglyness” of line different ~ slightly diff parameter?

Plot1: Residules v Fitted

```
plot(My.Mod,which=1)
```

```
D1 <- augment(My.Mod) %>%
  ggplot(aes(x=.fitted,y=.std.resid)) +
  geom_point() +
  geom_smooth(se=FALSE,colour="red",size=.25) +
  geom_hline(yintercept=0,linetype=3) +
  labs(title="Residuls vs Fitted",subtitle=My.Mod$call)
```

D1

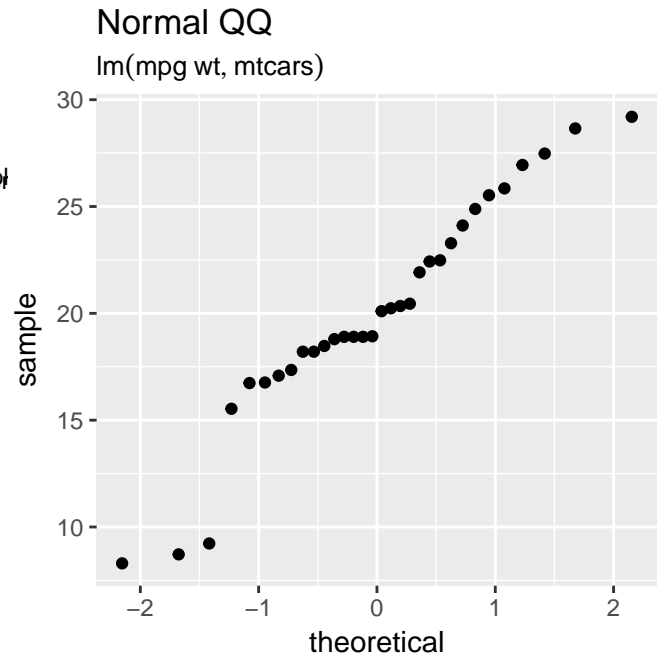
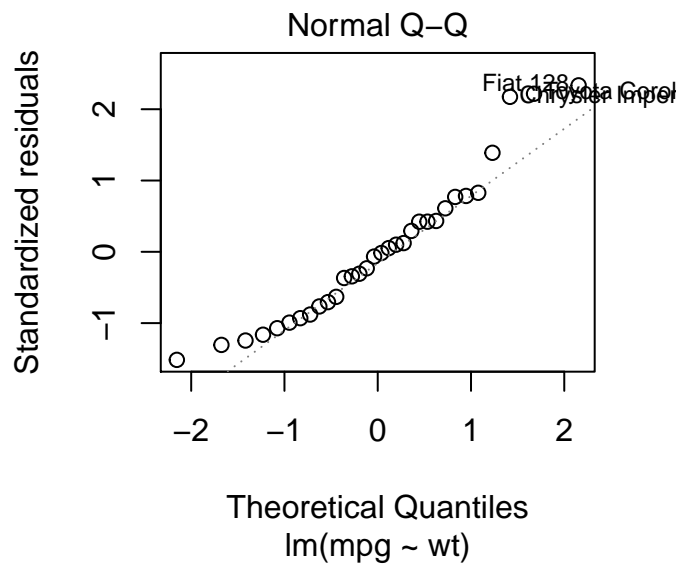


Plot2: Normal QQ

```
plot(My.Mod,which=2)

D2 <- augment(My.Mod) %>%
  ggplot(aes(sample=.fitted)) +
  stat_qq() +
  labs(title="Normal QQ",subtitle=My.Mod$call)
```

D2

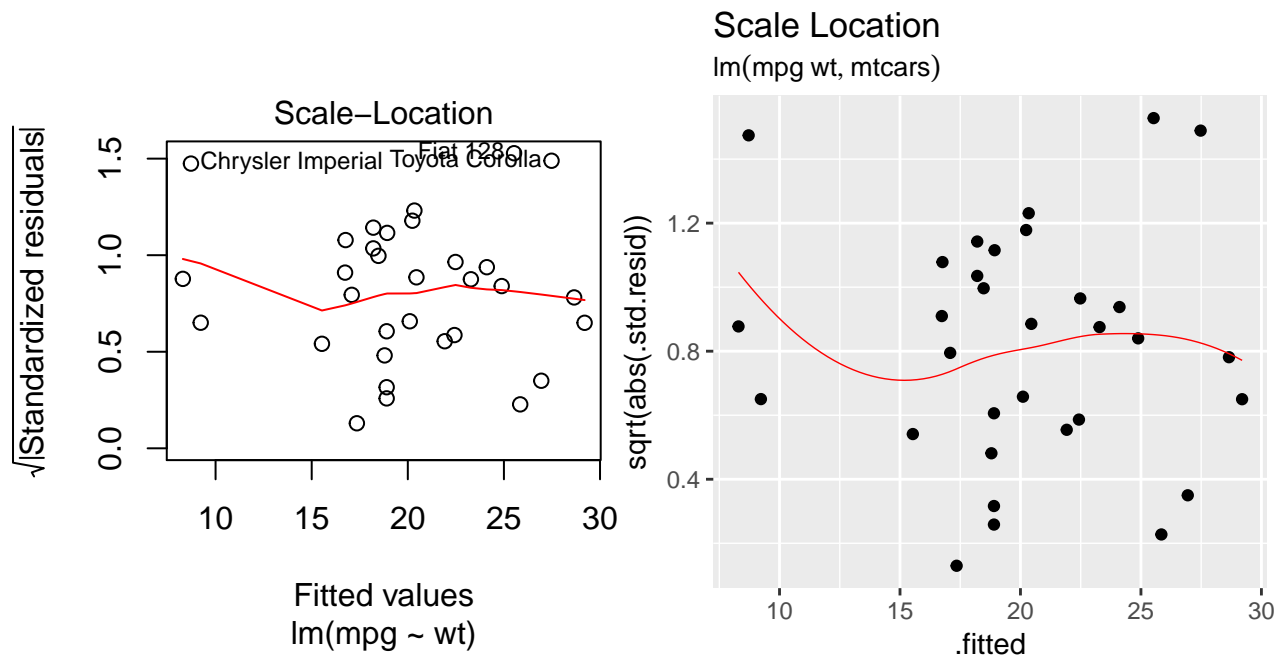


Plot3: Scale Location

```
plot(My.Mod,which=3)

D3 <- augment(My.Mod) %>%
  ggplot(aes(x=.fitted, y=sqrt(abs(.std.resid)))) +
  geom_point()+
  labs(title="Scale Location", subtitle=My.Mod$call) +
  geom_smooth(se=FALSE, colour="red", size=.25)
```

D3



Questions...

Missing Values? Why?

Line wiggliness. What parameters?

Missing Values

Raw

Tidy.Mod\$.std.resid

```
## [1] -0.76616765 -0.30743051 -0.70575249 0.43275114 -0.06681879
## [6] -0.23148309 -1.30552216 1.38889709 0.78392687 0.10010803
## [11] -0.36728706 0.29288651 -0.01683789 -0.63159969 0.42296071
## [16] 0.76979873 2.17353314 2.33490215 0.61035691 2.21708271
## [21] -0.87964013 -0.99313634 -1.24418015 -1.16279098 0.82771968
## [26] 0.12244407 0.05177187 0.42254270 -1.51549710 -0.93086929
## [31] -1.07151943 -0.34388215
```

Why so many NAN's?

`sqrt(Tidy.Mod$.std.resid)`

```
## [1]      NaN      NaN      NaN 0.6578382      NaN      NaN      NaN
## [8] 1.1785148 0.8853964 0.3163985      NaN 0.5411899      NaN      NaN
## [15] 0.6503543 0.8773817 1.4742907 1.5280387 0.7812534 1.4889871      NaN
## [22]      NaN      NaN      NaN 0.9097910 0.3499201 0.2275343 0.6500328
## [29]      NaN      NaN      NaN      NaN
```

Try Abs value

`sqrt(abs(Tidy.Mod$.std.resid))`

```
## [1] 0.8753100 0.5544642 0.8400908 0.6578382 0.2584933 0.4811269 1.1425945
## [8] 1.1785148 0.8853964 0.3163985 0.6060421 0.5411899 0.1297609 0.7947325
## [15] 0.6503543 0.8773817 1.4742907 1.5280387 0.7812534 1.4889871 0.9378913
## [22] 0.9965623 1.1154282 1.0783279 0.9097910 0.3499201 0.2275343 0.6500328
## [29] 1.2310553 0.9648157 1.0351422 0.5864147
```

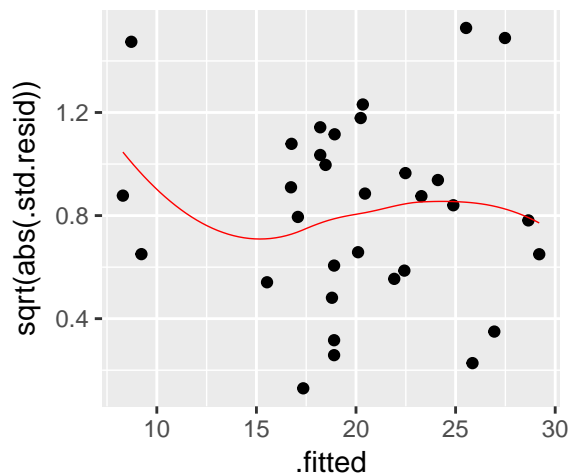
D3abs <- `augment(My.Mod) %>%`

```
  ggplot(aes(x=.fitted, y=sqrt(abs(.std.resid)))) +
  geom_point() +
  labs(title="Test SL with abs value", subtitle=My.Mod$call) +
  geom_smooth(se=FALSE, colour="red", size=.25)
```

D3abs

Test SL with abs value

`lm(mpg wt, mtcars)`



with text labels added

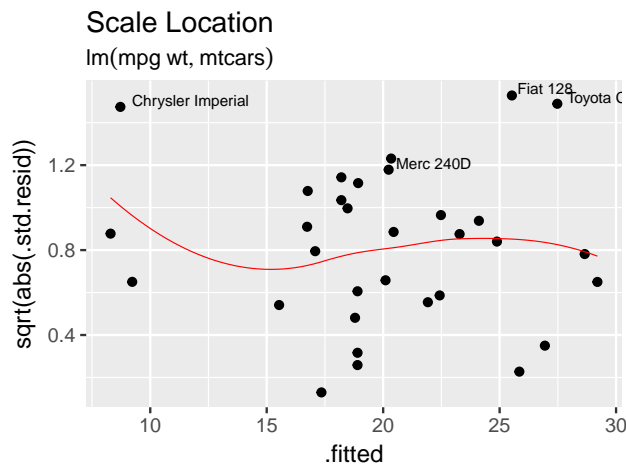
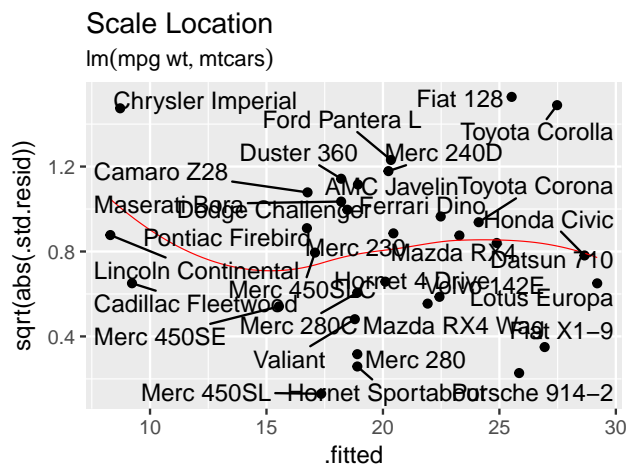
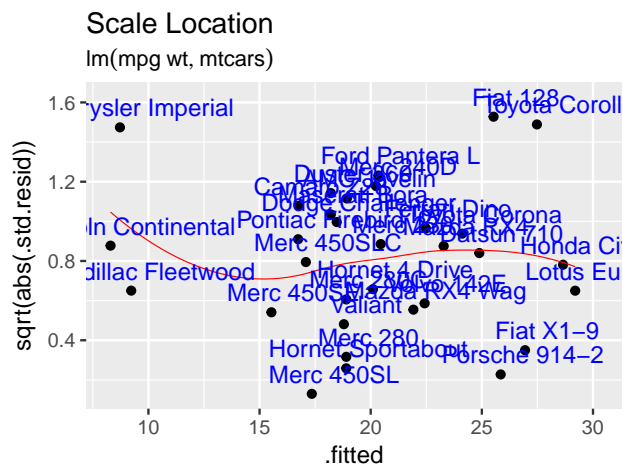
```
## text?
D3c <- D3 + geom_text(aes(label=.rownames),
  nudge_x = 1, nudge_y = .1,
  colour="blue")

# extra txt library
library(ggrepel)

D3d <- D3 + geom_text_repel(aes(label = .rownames))

D3e <- D3 + geom_text(aes(label=ifelse(
  (.std.resid>1*IQR(.std.resid)),.rownames,""),
  hjust=-0.1,vjust=-0.1,size=2.5))

#grid extra
grid.arrange(D3c, D3d, D3e, ncol=2)
```

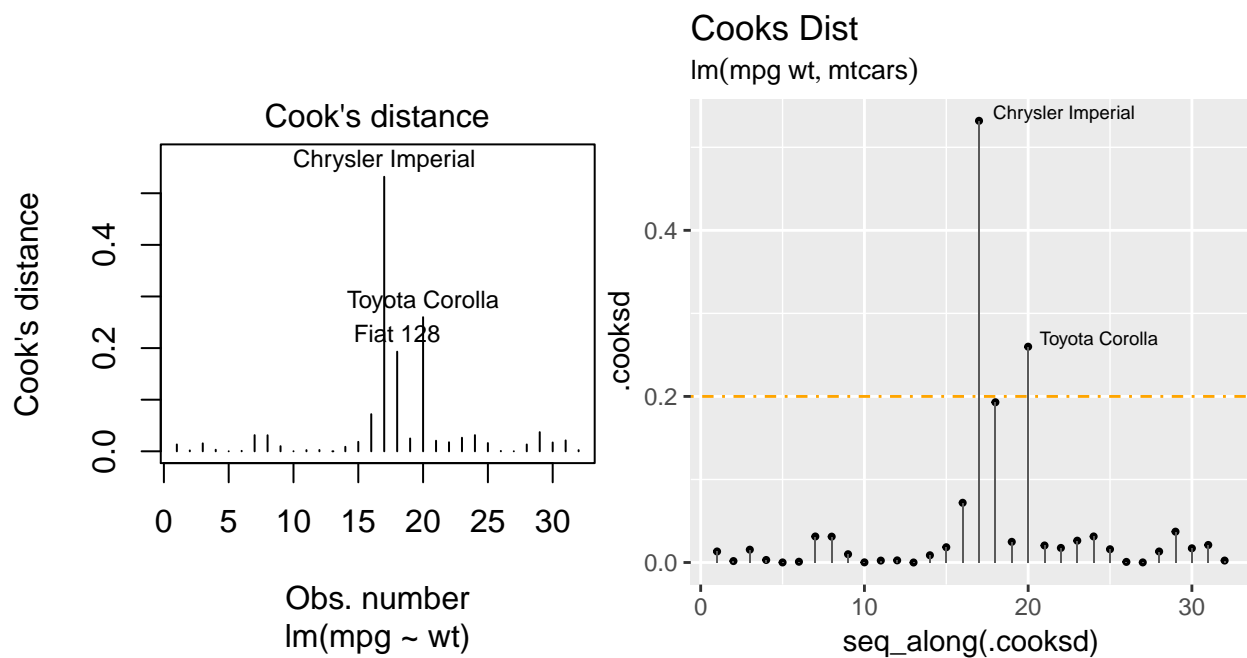


Plot4: Cooks Distance

```
#Cooks Distane
plot(My.Mod,which=4)

D4 <- augment(My.Mod) %>%
  ggplot(aes(x=seq_along(.cooksds), y=.cooksds)) +
  geom_point(size = .75) +
  geom_col(width = .1) +
  geom_hline(yintercept=.2,linetype=4,colour="orange") +
  labs(title="Cooks Dist",subtitle=My.Mod$call) +
  geom_text(aes(label=ifelse((.cooksds>.2),.rownames,"")),
            hjust=-0.1,vjust=-0.1,size=2.5)
```

D4

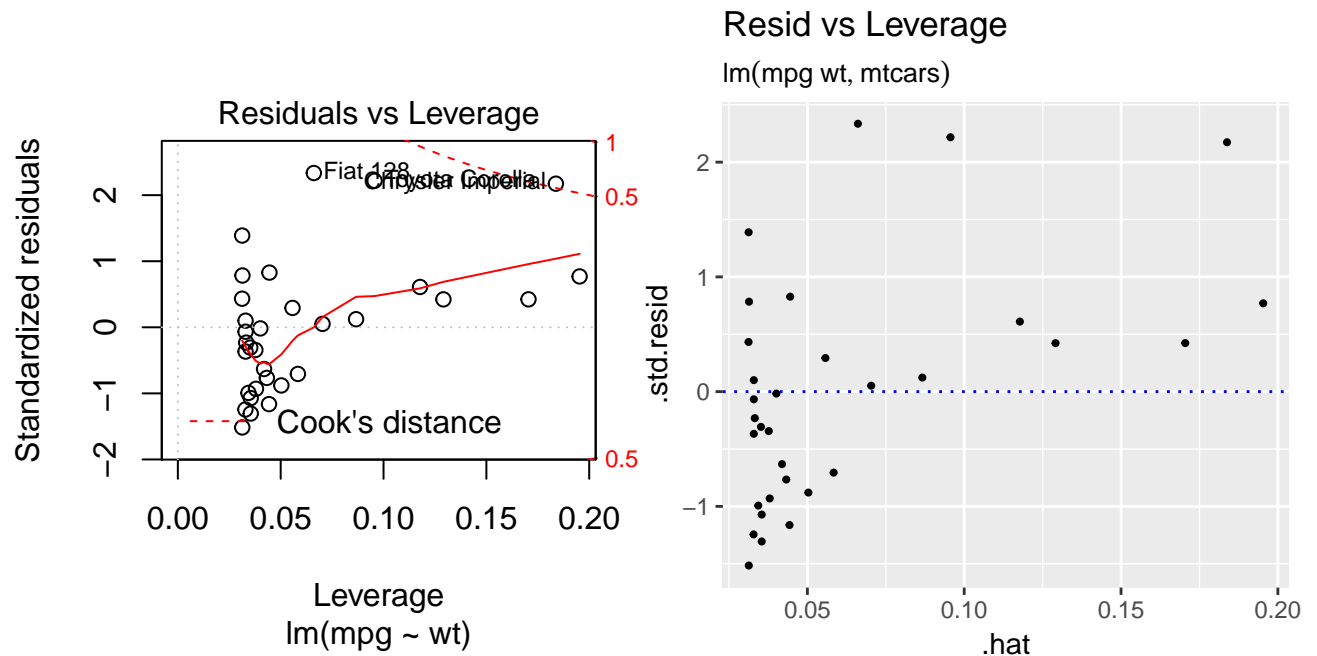


Plot5: Resid vs Leverage

```
# Resid vs Leverage
plot(My.Mod,which=5)

D5 <- augment(My.Mod) %>%
  ggplot(aes(x=.hat, y=.std.resid)) +
  geom_point(size=.75) +
  geom_hline(yintercept=0,linetype=3,colour="blue") +
  labs(title="Resid vs Leverage",subtitle=My.Mod$call)
```

D5

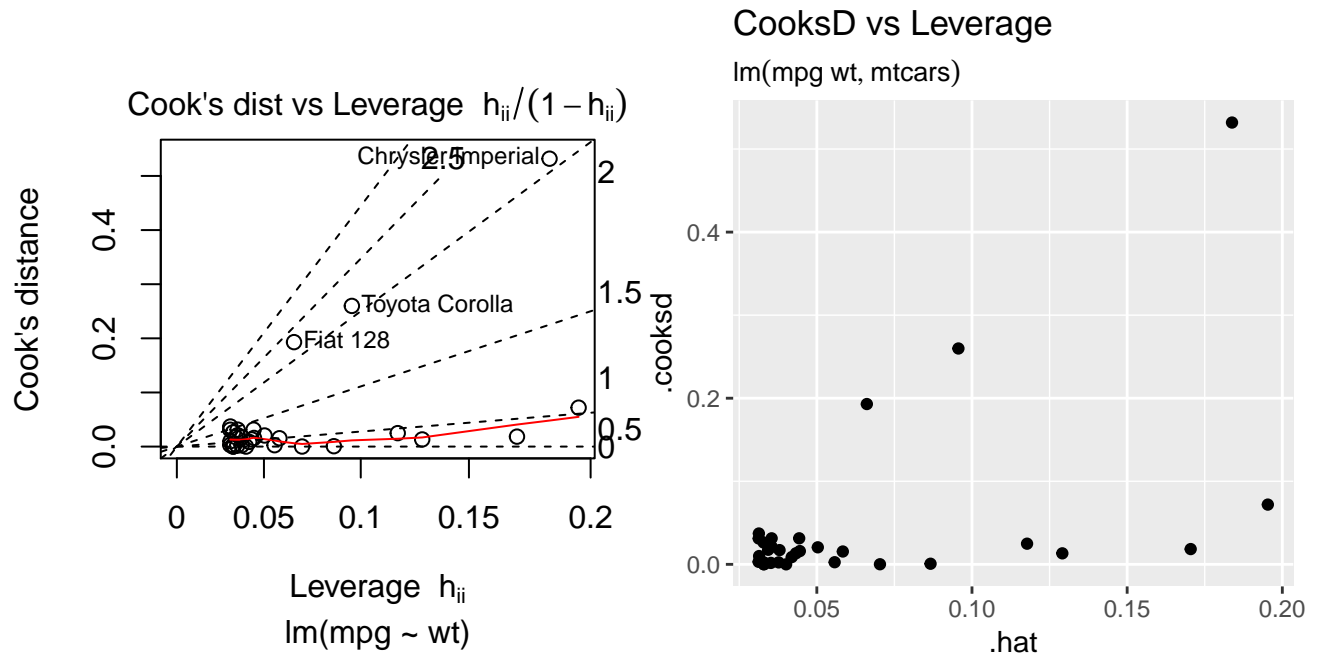


Plot6: CooksSD vs Leverage

```
plot(My.Mod,which=6)
```

```
D6 <- augment(My.Mod) %>%
  ggplot(aes(x=.hat, y=.cooks)) +
  geom_point() +
  labs(title="CooksD vs Leverage", subtitle=My.Mod$call)
```

D6

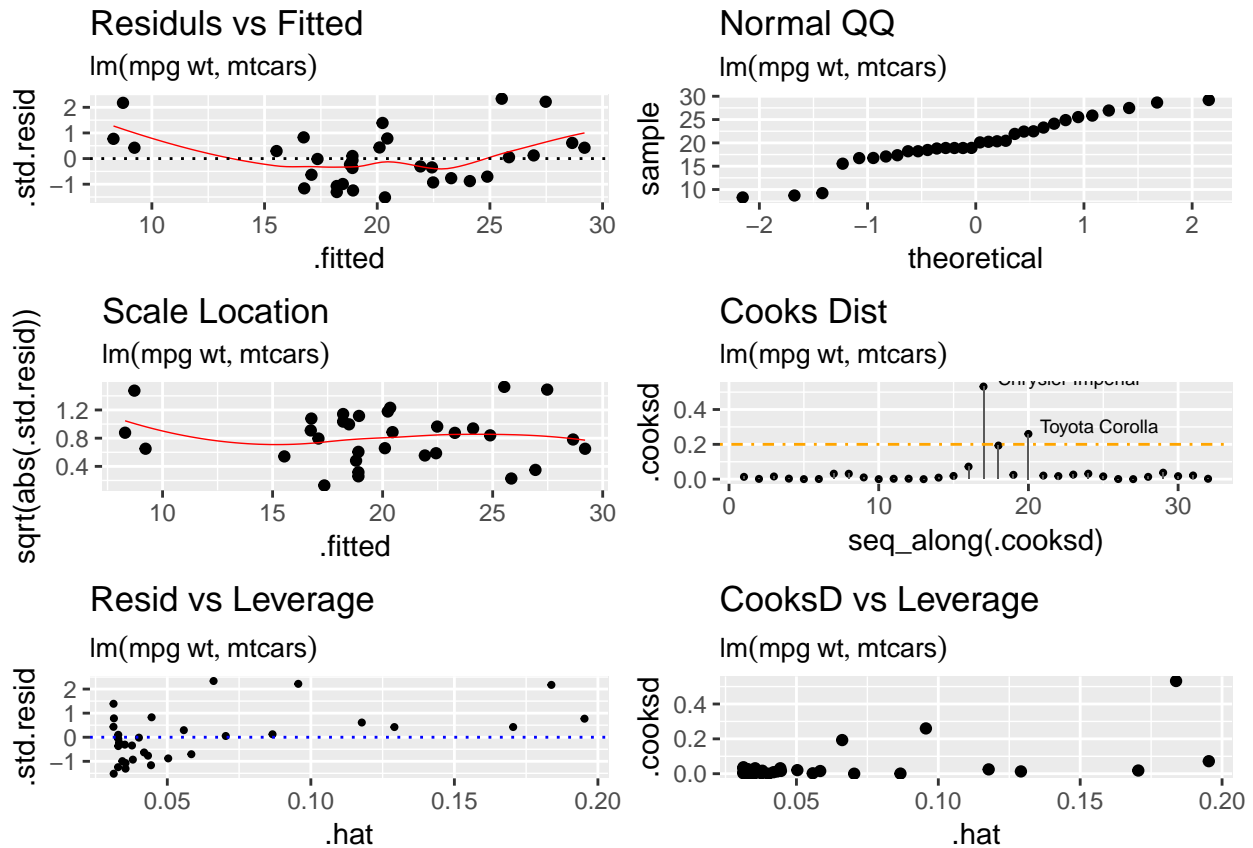


Panel

```
#library(gridExtra)
```

```
D.Panel <- grid.arrange(D1, D2, D3, D4, D5, D6, ncol=2)
```

```
D.Panel
```



```
## TableGrob (3 x 2) "arrange": 6 grobs
##   z      cells   name      grob
## 1 1 (1-1,1-1) arrange gtable[layout]
## 2 2 (1-1,2-2) arrange gtable[layout]
## 3 3 (2-2,1-1) arrange gtable[layout]
## 4 4 (2-2,2-2) arrange gtable[layout]
## 5 5 (3-3,1-1) arrange gtable[layout]
## 6 6 (3-3,2-2) arrange gtable[layout]
```

```
par(mfrow=c(2,3))
plot(My.Mod,which=1:6)
```

