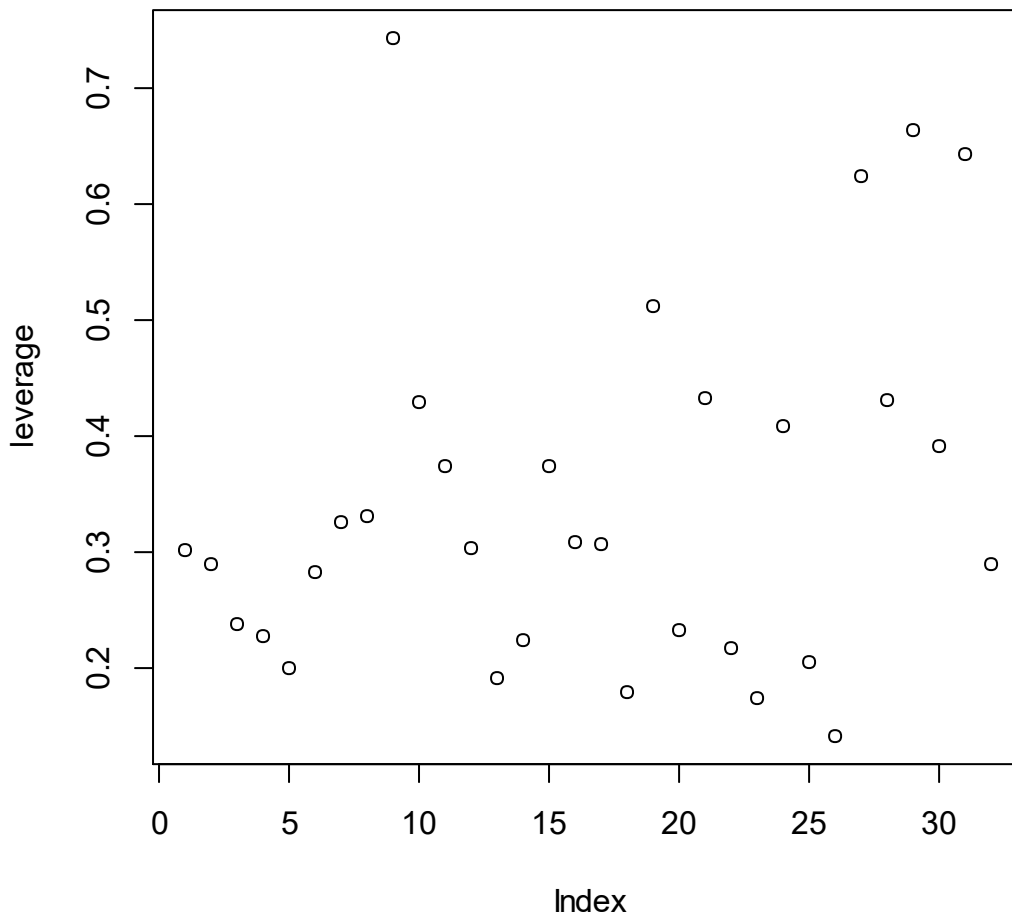


R Lab 12. Influential Data Analysis

```
> reg = lm(mpg~.,data=mtcars)
> infl = influence(reg)
> names(infl)
[1] "hat"      "coefficients" "sigma"      "wt.res"
```

Contains hat diagonals H_{ii} , vector of coefficients (without the i th case), s = RMSE (without the i th case)

```
> leverage = infl$hat
> p = 10; n = length(mpg); mean_leverage = (p+1)/n;
> mean_leverage
[1] 0.34375
> mean(leverage)
[1] 0.34375
> plot(leverage)
```



```
> infl$coefficients
      (Intercept)      cyl      disp      hp
Mazda RX4      -1.51953212 0.0066222621 -1.746129e-03 5.728104e-03
Mazda RX4 Wag  0.09977168 -0.0343756932 -1.779194e-04 3.133630e-03
```

```
Datsun 710      -4.49406953  0.1397388420  5.180829e-03 -6.441502e-03
< truncated >
> infl$sigma
  Mazda RX4   Mazda RX4 Wag   Datsun 710   Hornet 4 Drive
  2.681664    2.699561         2.567603    2.715329
< truncated >
```

ADDITIONAL PACKAGE "CAR" (Go to "Packages" tab and choose "car")

```
> install.packages("car")
> library(car)
> outlierTest(reg)
```

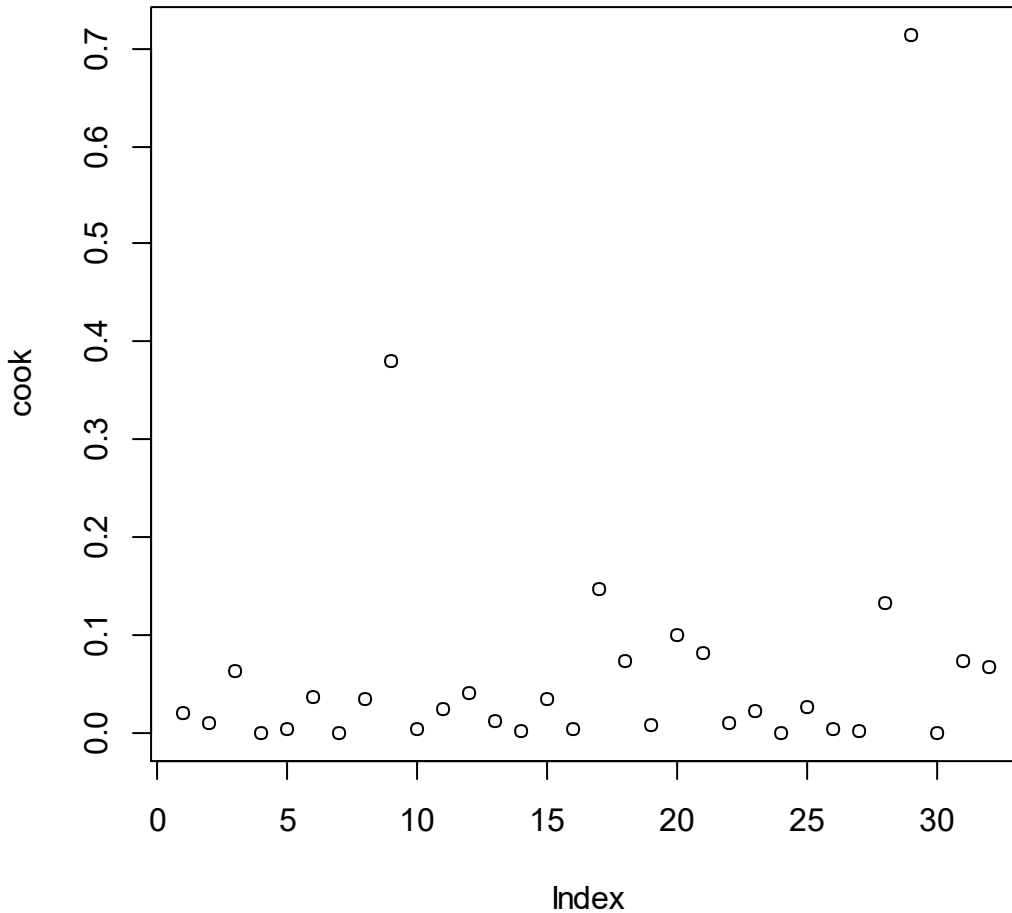
 rstudent unadjusted p-value Bonferonni p

```
321 4.272284    2.4397e-05  0.0095635
```

Cook's Distance

```
> cook = cooks.distance(reg)
> cooks.distance(reg)
  Mazda RX4   Mazda RX4 Wag   Datsun 710   Hornet 4 Drive
  2.059098e-02  9.218355e-03    6.352411e-02  1.306707e-04
```

```
> plot(cook)
```



The Cook's distance measures the effect of deleting the i-th observation

```
> cook[ cook > 0.3 ]
      Merc 230 Ford Pantera L
0.3792206  0.7135206
```

```
> influence.measures(reg)
```

Besides the Cook's distance, it calculates DFBETS, DFFITS, and other measures of influence

```
> influence.measures(reg)
```

Influence measures of

```
lm(formula = mpg ~ ., data = mtcars) :
```

	dfb.l_	dfb.cyl	dfb.disp	dfb.hp	dfb.drat	dfb.wt	dfb.qsec
Mazda RX4	-0.080228	0.006263	-0.096634	0.260049	0.035485	0.109069	-0.015734
0.098621	-0.139736	0.166814	-0.258558	-0.47034	1.859	2.06e-02	0.303
Mazda RX4 Wag	0.005233	-0.032293	-0.009781	0.141320	0.003009	0.013676	-0.046659
0.090681	-0.129349	0.086761	-0.126009	-0.31261	2.115	9.22e-03	0.290
Datsun 710	-0.247818	0.138020	0.299453	-0.305427	0.187003	-0.385911	0.273358
-0.190640	-0.371231	0.102704	0.406685	-0.86281	0.655	6.35e-02	0.239