

Exercise2.4_5

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September 8, 2019

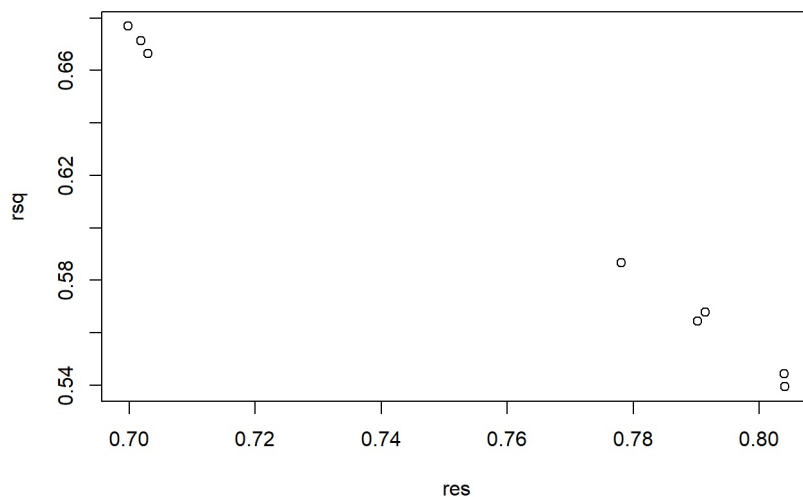
Exercise LMR2.4

A high R-square tells us that data is closer to the fitted value while a low residual gives the measure of how close the data falls from the regression line. In our plot Stats we can see that as we add more variables the residuals decrease and the R-squared increases. This tells us the data is getting closer to the regression line as we add more variables.

```
sstat
```

```
##      res      rsq
## 1 0.8040746 0.5394319
## 2 0.8039630 0.5444065
## 3 0.7902322 0.5645183
## 4 0.7914627 0.5678581
## 5 0.7781510 0.5868129
## 6 0.7029589 0.6665122
## 7 0.7018555 0.6712521
## 8 0.6997800 0.6768655
```

```
plot(sstat)
```



Exercise LMR2.5

This exercise seems that the regression lines would never intersect could this be correct?

```
#LMR 2.5
```

```
data(prostate, package="faraway")
fit1<-lm(lpsa~lcavol, data=prostate)
summary(fit1)
```

```
##
## Call:
## lm(formula = lpsa ~ lcavol, data = prostate)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.67625 -0.41648  0.09859  0.50709  1.89673
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  1.50730     0.12194   12.36  <2e-16 ***
## lcavol       0.71932     0.06819   10.55  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7875 on 95 degrees of freedom
## Multiple R-squared:  0.5394, Adjusted R-squared:  0.5346
## F-statistic: 111.3 on 1 and 95 DF,  p-value: < 2.2e-16
```

```
fit2<-lm(lcavol~lpsa, data=prostate)
summary(fit2)
```

```
##
## Call:
## lm(formula = lcavol ~ lpsa, data = prostate)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.15948 -0.59383  0.05034  0.50826  1.67751
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.50858    0.19419   -2.619  0.0103 *
## lpsa         0.74992    0.07109   10.548  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8041 on 95 degrees of freedom
## Multiple R-squared:  0.5394, Adjusted R-squared:  0.5346
## F-statistic: 111.3 on 1 and 95 DF,  p-value: < 2.2e-16
```

```
plot(lcavol~lpsa,prostate)
abline(fit1,col="red")
abline(fit2,col="blue")
```

