LAB_4_AMAT565

September 25, 2019

1 Enzo Rodriguez

1.1 Importing the data set

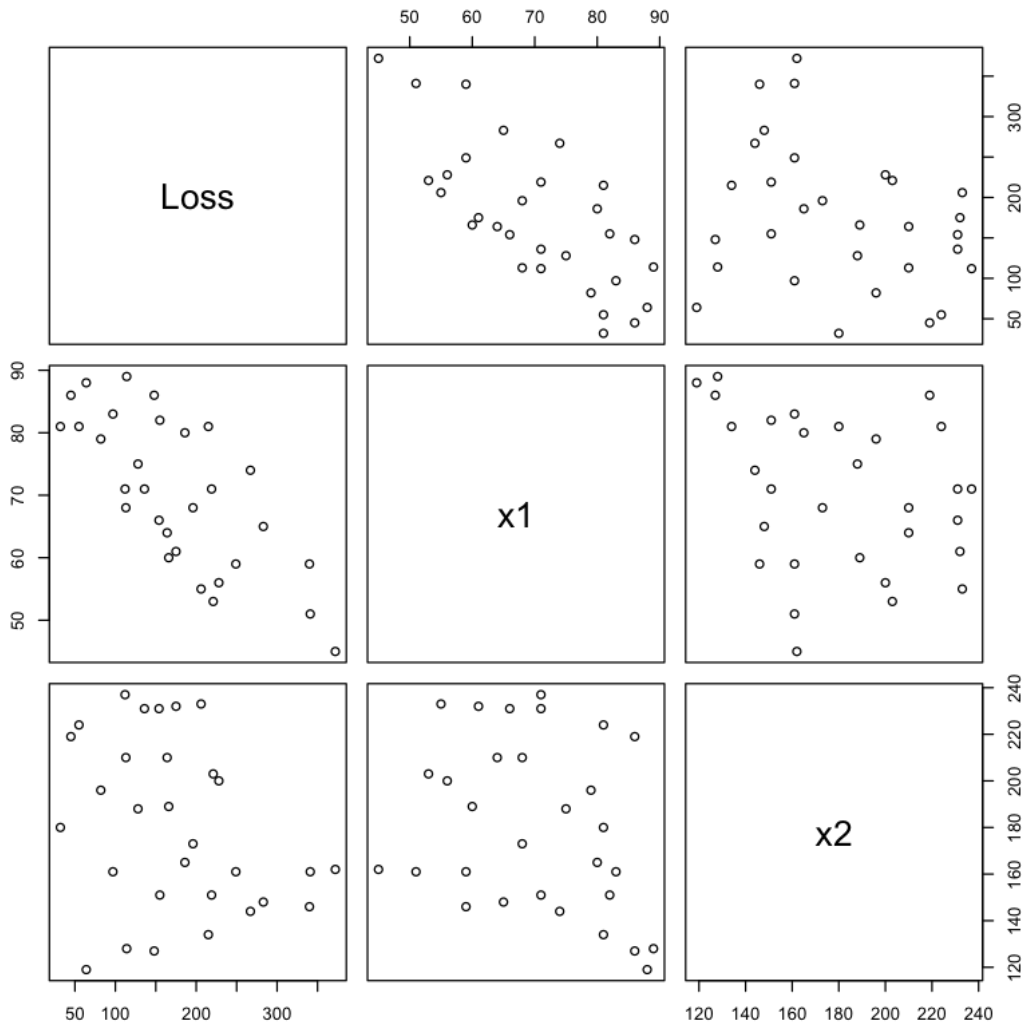
[1]:
```
library(readxl)
abrasion <- read.csv("~/Desktop/abrasion.csv", header=TRUE)
'View(abrasion)'
```

'View(abrasion)'

[2]:
```
# Ploting variables and looking at correlations
plot(abrasion)
cor(abrasion)
```

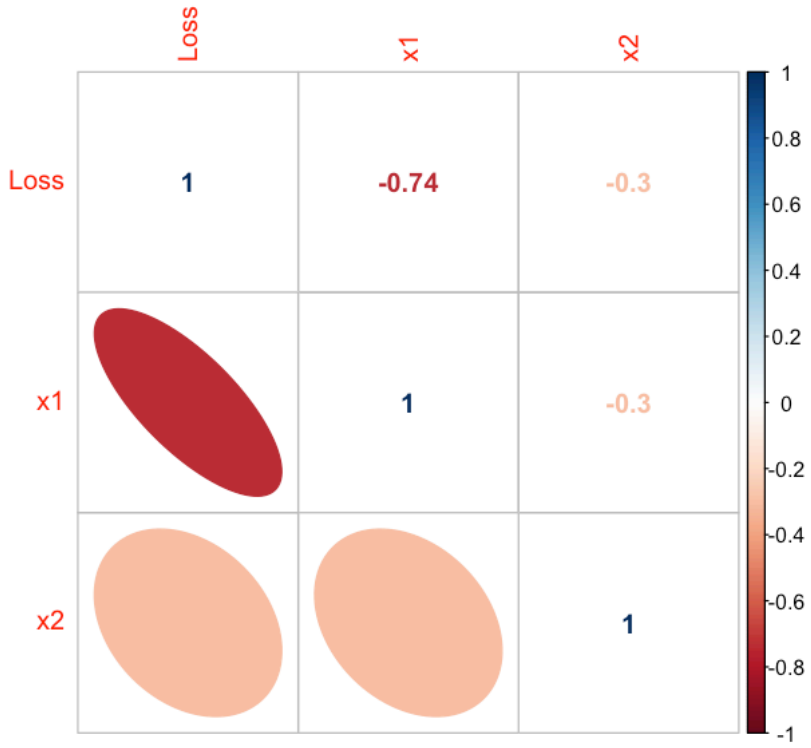
A matrix: 3 Œ 3 of type dbl

	Loss	x1	x2
Loss	1.0000000	-0.7377107	-0.2983939
x1	-0.7377107	1.0000000	-0.2992345
x2	-0.2983939	-0.2992345	1.0000000



[3]:
```
library(corrplot)
corrplot.mixed(cor(abrasion) , lower = "ellipse", upper = "number",
               sig.level = 0.02,
               insig = "n", tl.pos = "lt",diag='u')  #p.mat = p,  order =␣
 ↪"hclust",
```

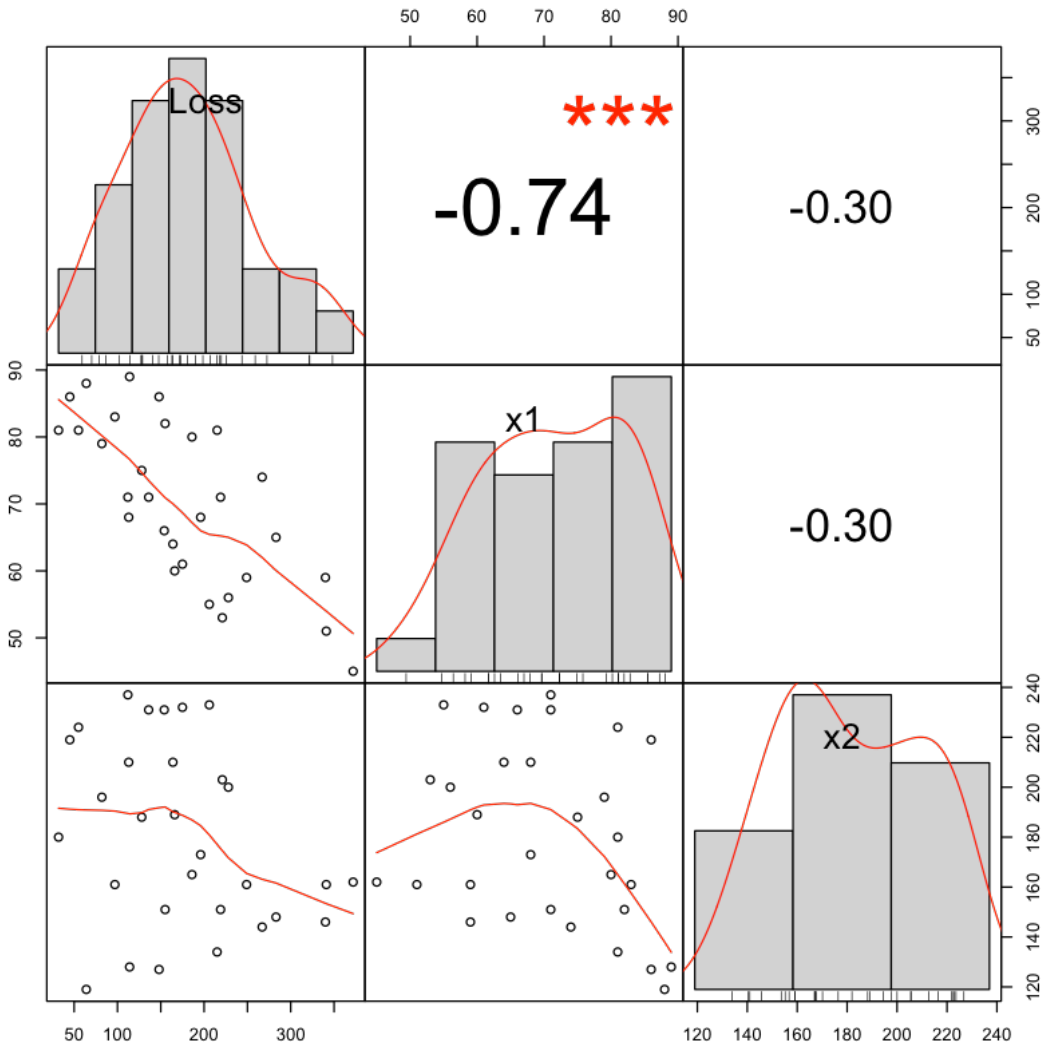
```
corrplot 0.84 loaded
```



[4]:
```
library("PerformanceAnalytics")
chart.Correlation(abrasion, histogram=TRUE, pch=19)
```

```
Loading required package: xts
Loading required package: zoo

Attaching package: zoo

The following objects are masked from package:base:

    as.Date, as.Date.numeric
```

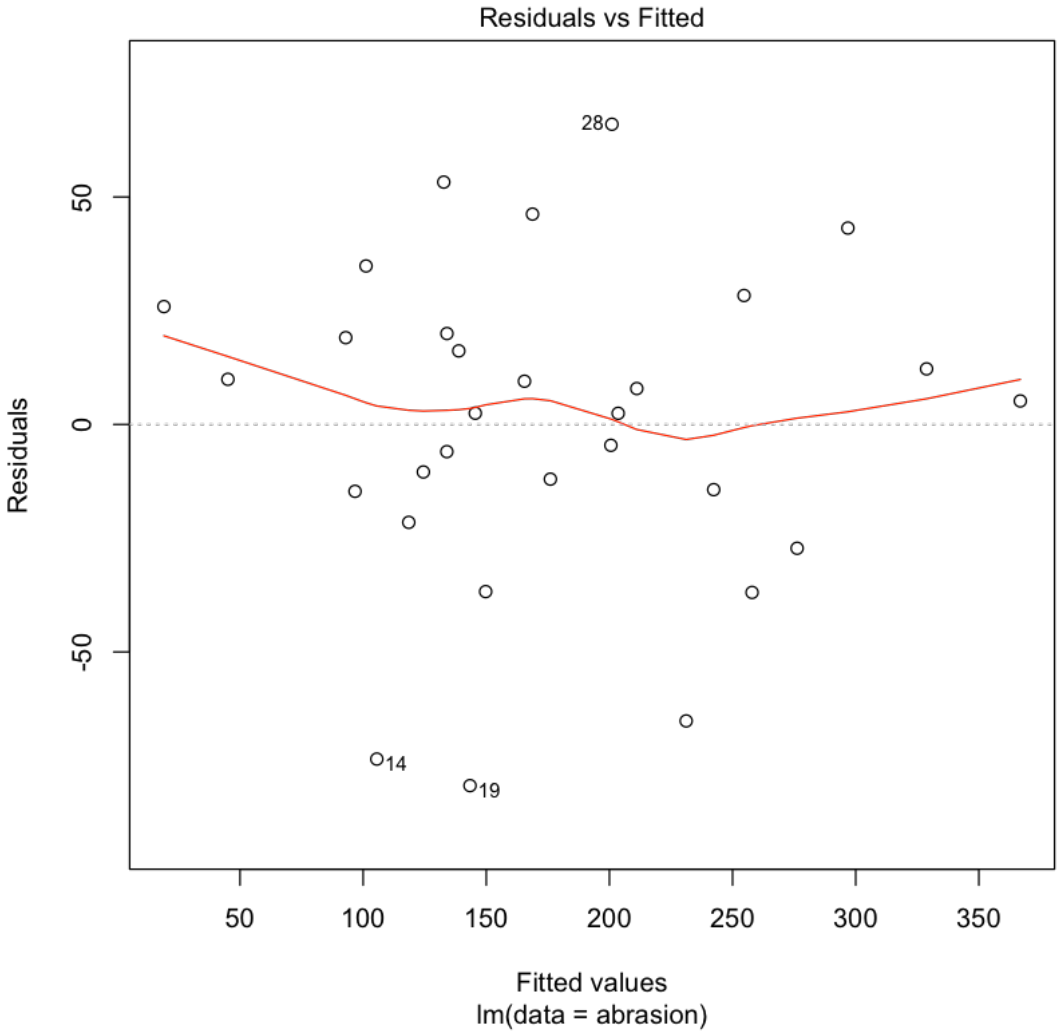
```
Attaching package: PerformanceAnalytics

The following object is masked from package:graphics:

    legend
```

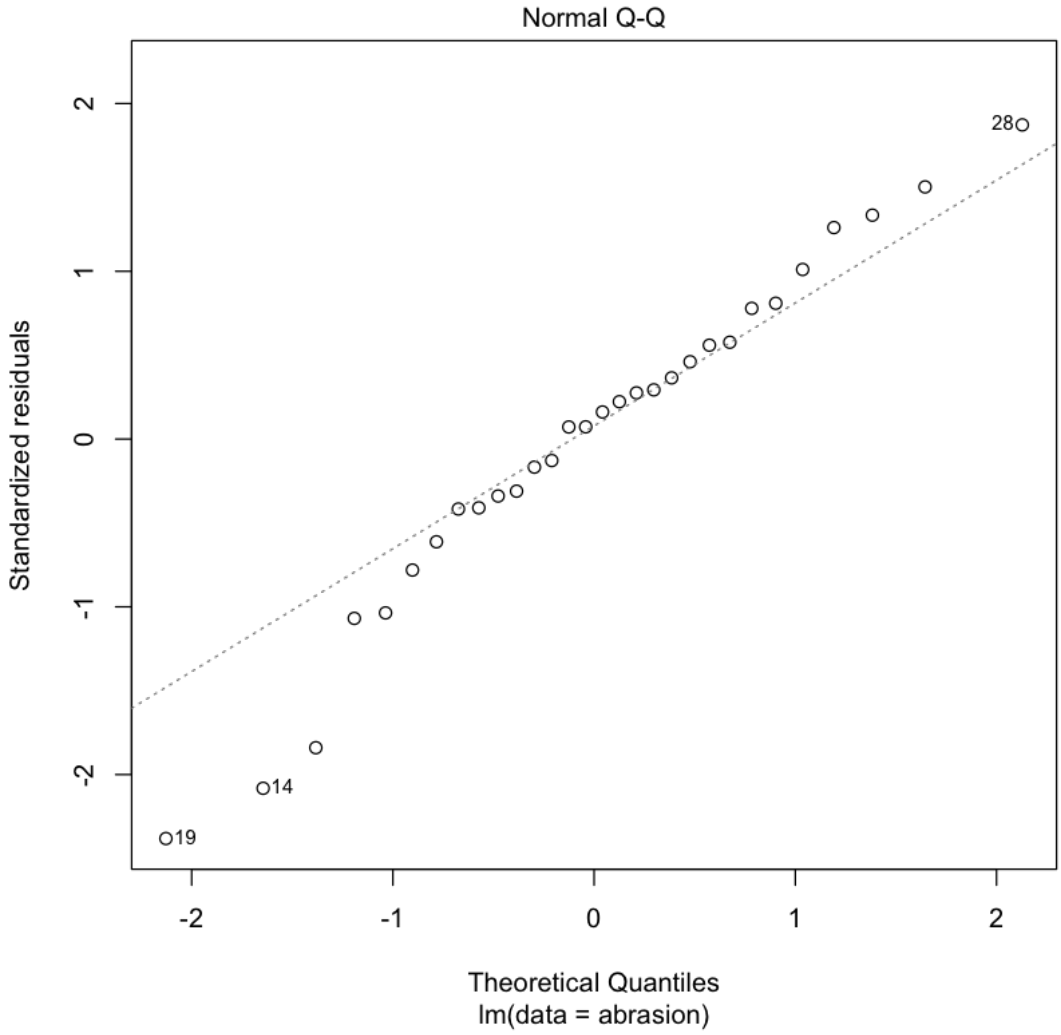


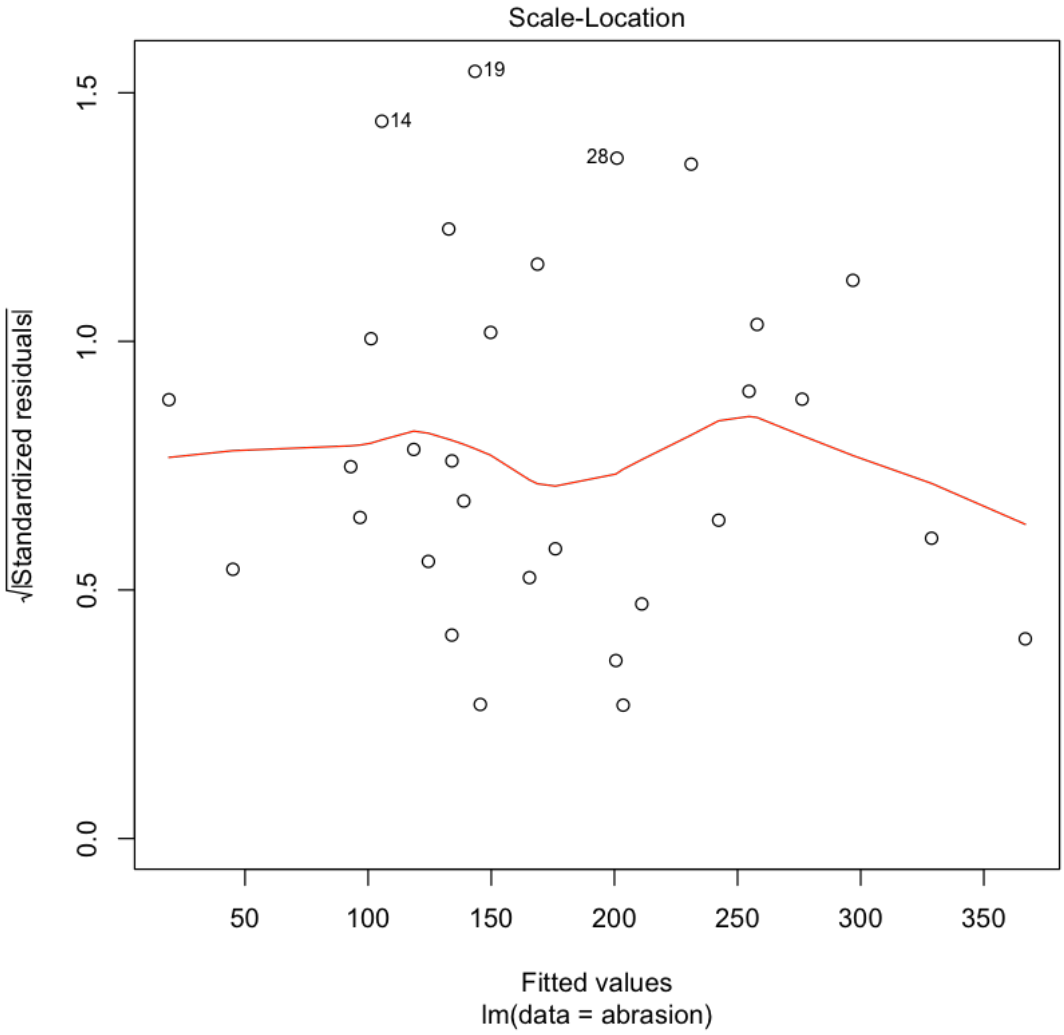
[5]:
```
abrasion.model<-lm(data=abrasion)
summary(abrasion.model)
plot(abrasion.model)
title(main="Scatter Plot VS.Correlation")
```

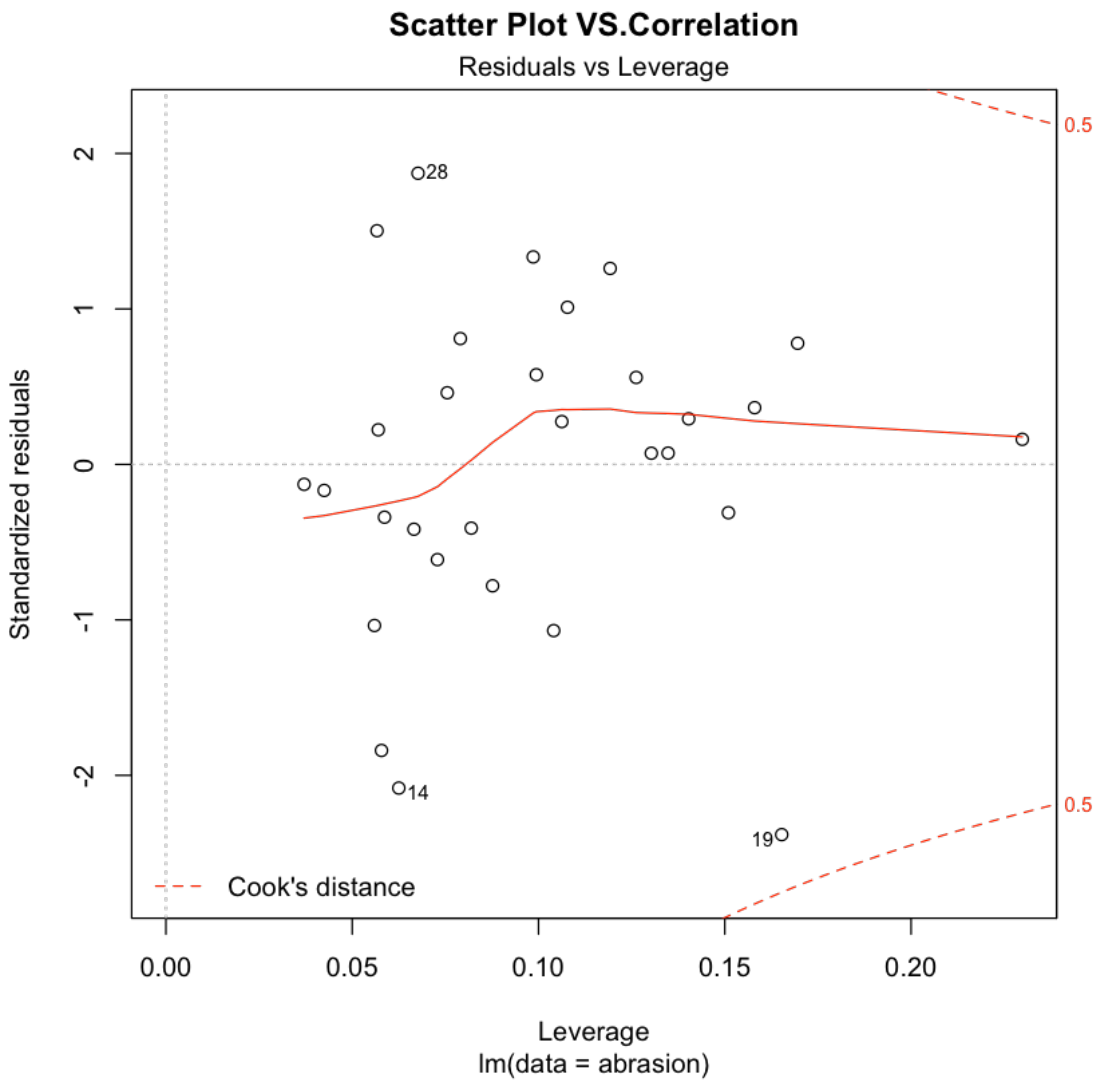
```
Call:
```

```
lm(data = abrasion)

Residuals:
    Min      1Q  Median      3Q     Max
-79.385 -14.608   3.816  19.755  65.981

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 885.1611    61.7516  14.334 3.84e-14 ***
x1           -6.5708     0.5832 -11.267 1.03e-11 ***
x2           -1.3743     0.1943  -7.073 1.32e-07 ***
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1   1

Residual standard error: 36.49 on 27 degrees of freedom
Multiple R-squared:  0.8402,Adjusted R-squared:  0.8284
F-statistic:    71 on 2 and 27 DF,  p-value: 1.767e-11
```


Residuals vs Fitted
Residuals
50
0
-50
28
14
19
50
100
150
200
250
300
350
Fitted values
lm(data = abrasion)


Normal Q-Q
Standardized residuals
Theoretical Quantiles
lm(data = abrasion)
28
14
19
-2
-1
0
1
2


Scale-Location
19
14
28
1.5
1.0
0.5
0.0
√|Standardized residuals|
50
100
150
200
250
300
350
Fitted values
lm(data = abrasion)



[6]:
```
abrasion.model$coefficients%*%c(1,71,201)
newx<-data.frame(x1=71,x2=201)
predict(abrasion.model,newx,interval='predict',level=0.98)
```

A matrix: 1 Œ 1 of type dbl

142.3955

A matrix: 1 Œ 3 of type dbl

fit	lwr	upr
142.3955	50.10941	234.6816

[8]:
```
# Anova table
anova(abrasion.model)
```

A anova: 3 Œ 5

	Df <int>	Sum Sq <dbl>	Mean Sq <dbl>	F value <dbl>	Pr(>F) <dbl>
x1	1	122455.04	122455.037	91.96967	3.458255e-10
x2	1	66606.59	66606.586	50.02477	1.324645e-07
Residuals	27	35949.74	1331.472	NA	NA

[ ]: