5303hw7

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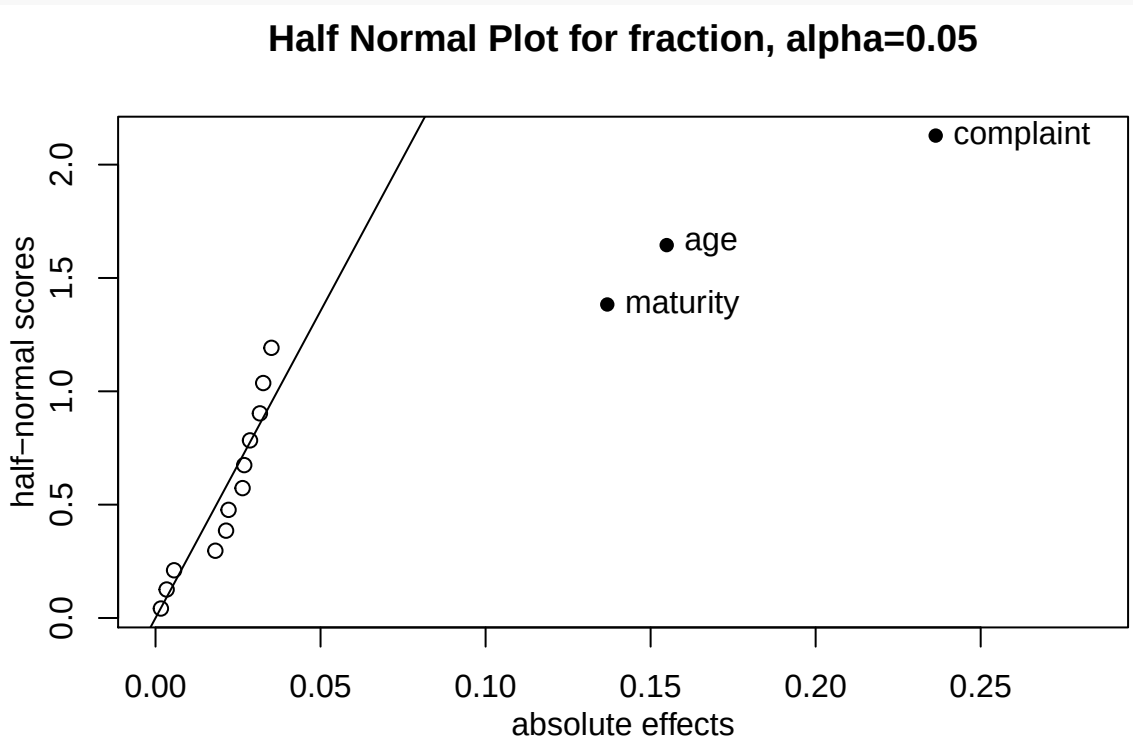
9.8

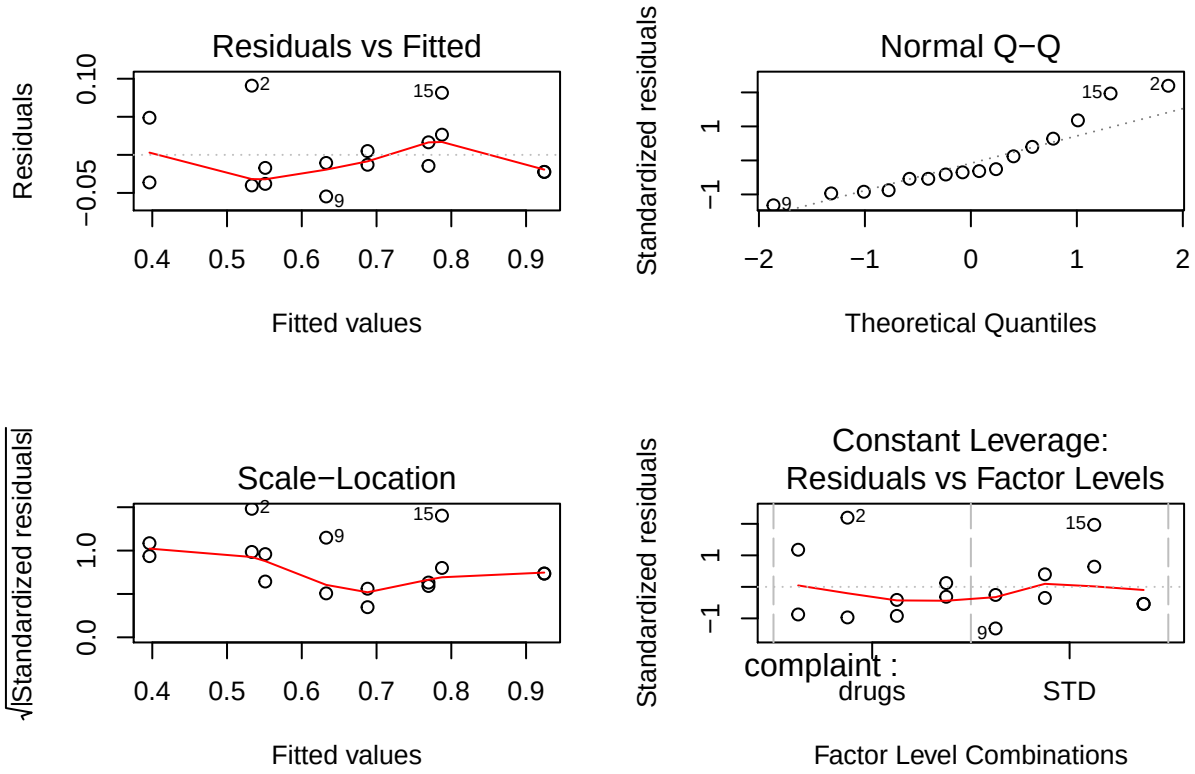
```
library(cfcdae)
data("CALM")
head(CALM)
```

```
##   complaint age time.known maturity fraction
## 1     drugs  14         <1    immat    0.445
## 2     drugs  14         <1   mature    0.624
## 3     drugs  14         >5    immat    0.360
## 4     drugs  14         >5   mature    0.493
## 5     drugs  17         <1    immat    0.513
## 6     drugs  17         <1   mature    0.693
```

```
CALM$age = as.factor(CALM$age)
TwoSeriesPlots(lm(fraction~complaint*age*time.known*maturity,data=CALM))
```




```
par(mfrow = c(2,2))
plot(lm(fraction ~ complaint + age +  maturity,data = CALM))
```

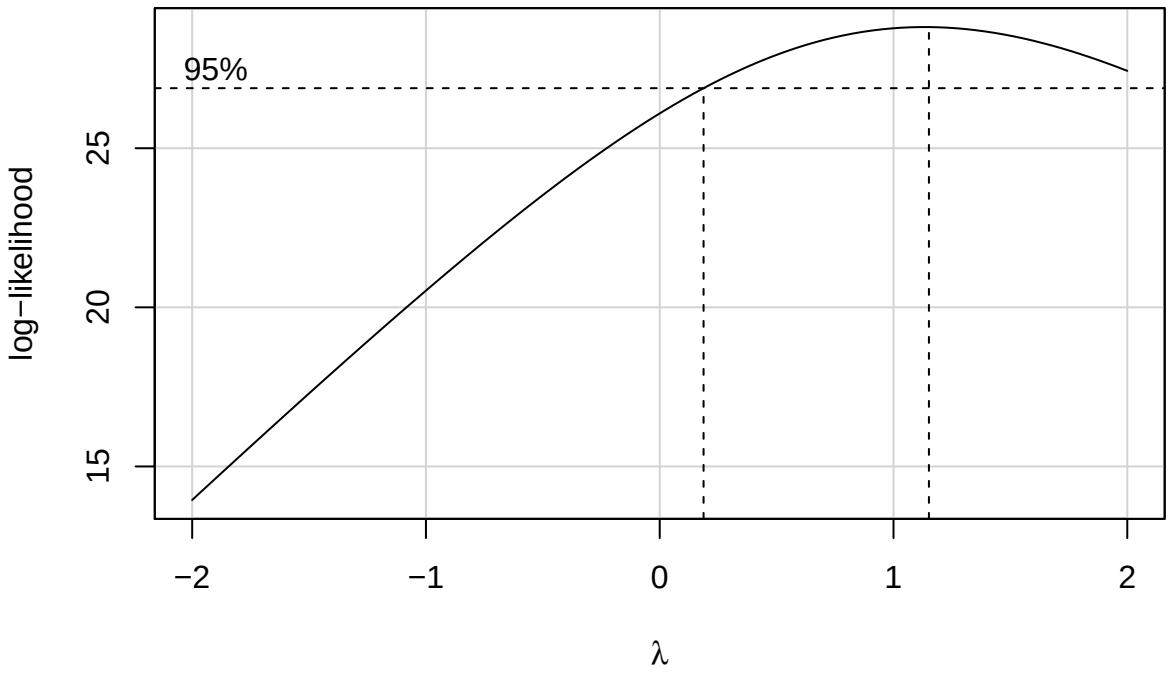


up to now, I can see that the significant terms are age, maturite and complaint, no interactions, while take a brief look at the interaction in the model:

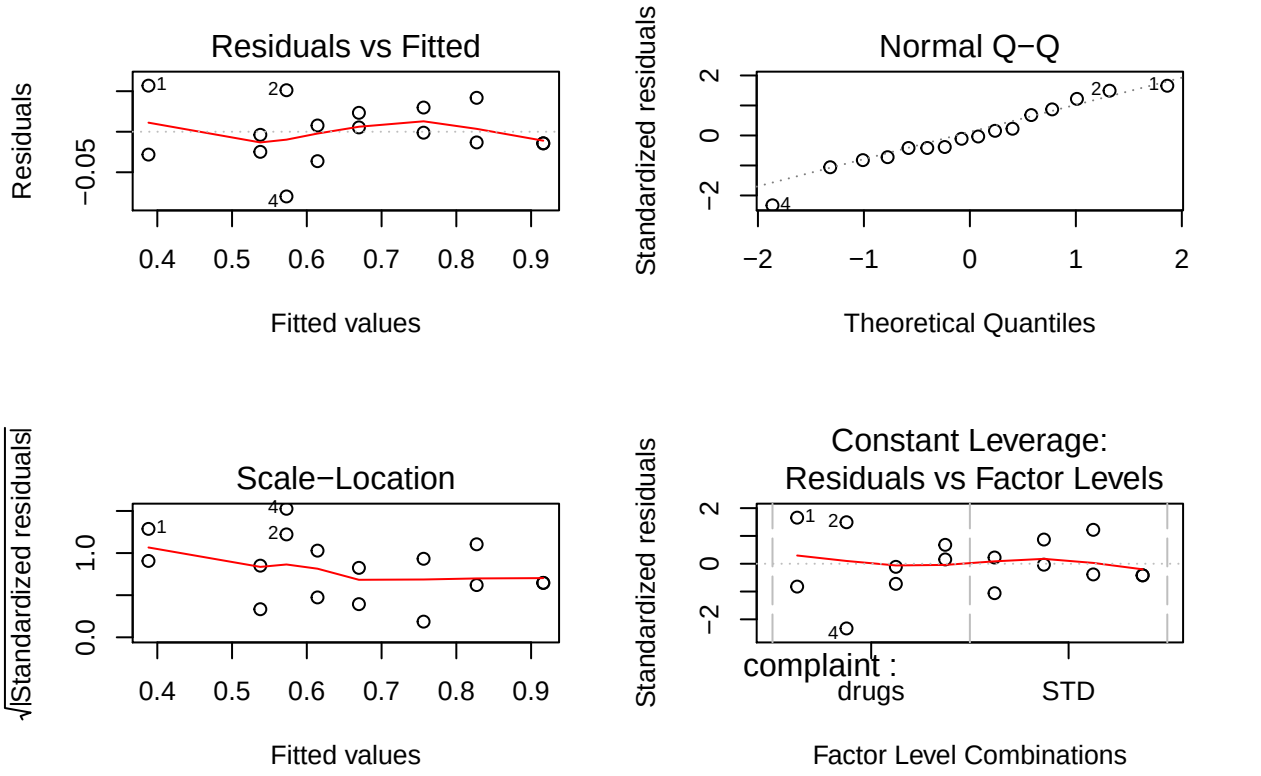
```
library(car)
```

```
## Loading required package: carData
```

```
par(mfrow = c(1,1))
boxCox(lm(fraction ~ complaint + age +  maturity,data = CALM))
```



```r
# we don't need transformation, take at look at the interaction model
m1 <- lm(fraction ~ (complaint + age +  maturity)^2, data = CALM)
par(mfrow = c(2,2))
plot(m1)
```




```r
anova(m1)
```

```
## Analysis of Variance Table
##
## Response: fraction
##                     Df   Sum Sq  Mean Sq  F value    Pr(>F)
## complaint            1 0.223493 0.223493 106.9112 2.708e-06 ***
## age                  1 0.095945 0.095945  45.8968 8.134e-05 ***
## maturity             1 0.074939 0.074939  35.8483 0.0002057 ***
## complaint:age        1 0.004001 0.004001   1.9137 0.1998970
## complaint:maturity   1 0.001828 0.001828   0.8742 0.3741903
## age:maturity         1 0.002783 0.002783   1.3311 0.2783300
## Residuals            9 0.018814 0.002090
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

while, the anova table confirms that only the complaint, age and maturity are significant, the intercation terms are not.

9.17

While, when looking at the residual plot, I can clearly see a noticeable pattern, so we need take the plot to check the assumption and we may use boxcox to check the proper transformation.

9.19

Definitely the second one, both of them shows that the main effect of A and B are significant, and others seems significant, whlie, the residual plot of the log transformation is better, it changes the pattern of U to the small unequal.