

Assignment 3 Exercise 3

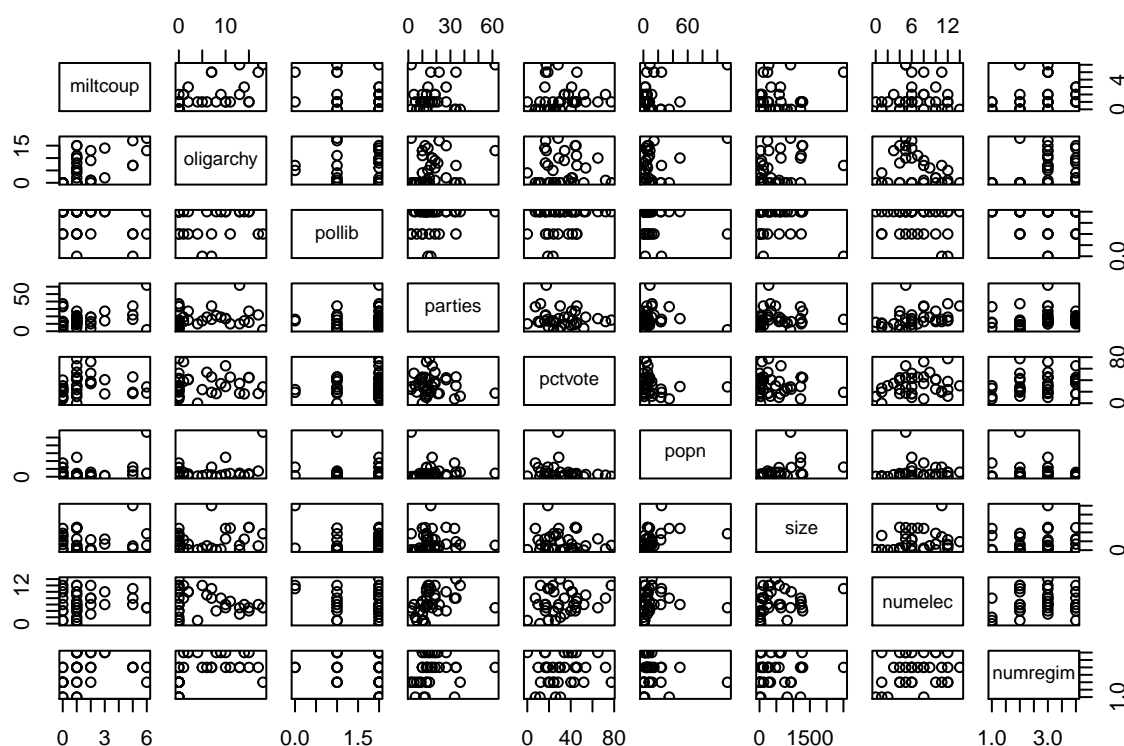
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Exercise 3

a) First we check if there are any linear correlated factors in the model:

```
africa = read.table("africa.txt", header = TRUE)
plot(africa)
```



We conclude that there are no linear correlations.

With the generalised linear regression model function we run the poisson regression with the following result:

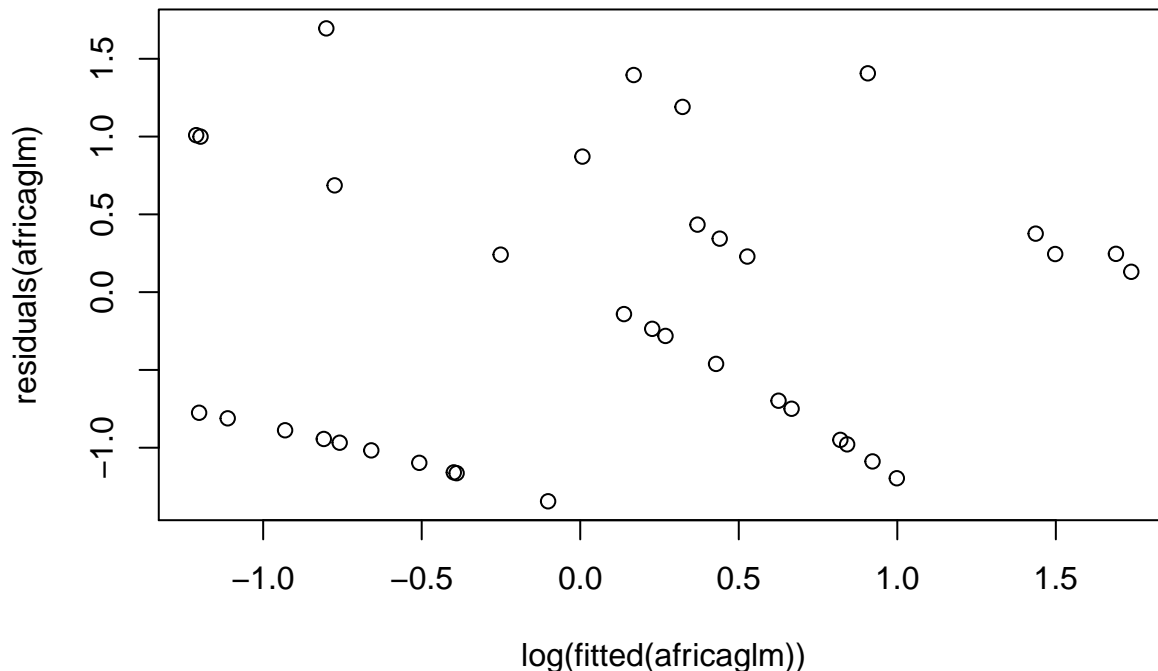
```
africaglm=glm(miltcoup~oligarchy+pollib+parties+pctvote+popn+size+numelec+numregim, family=poisson,data=africa)
summary(africaglm)
```

```
##
## Call:
## glm(formula = miltcoup ~ oligarchy + pollib + parties + pctvote +
##      popn + size + numelec + numregim, family = poisson, data = africa)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -1.3443  -0.9542  -0.2587   0.3905   1.6953
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
```

```
## (Intercept) -0.5102693  0.9053301 -0.564  0.57301
## oligarchy   0.0730814  0.0345958  2.112  0.03465 *
## pollib      -0.7129779  0.2725635 -2.616  0.00890 **
## parties     0.0307739  0.0111873  2.751  0.00595 **
## pctvote     0.0138722  0.0097526  1.422  0.15491
## popn        0.0093429  0.0065950  1.417  0.15658
## size        -0.0001900  0.0002485 -0.765  0.44447
## numelec     -0.0160783  0.0654842 -0.246  0.80605
## numregim     0.1917349  0.2292890  0.836  0.40303
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
## Null deviance: 65.945  on 35  degrees of freedom
## Residual deviance: 28.668  on 27  degrees of freedom
## AIC: 111.48
##
## Number of Fisher Scoring iterations: 6
```

We conclude that oligarchy, pollib and parties significantly estimate (or have a linear relation with) the amount of successful military coups. Furthermore the plotted residuals against the fitted values show kind of equal variances. However a pattern can be seen, but I am not sure what this indicates (as we are not familiar enough with deviance residuals).

```
plot(log(fitted(africaglm)),residuals(africaglm))
```



b) In the step down method we have removed the following factors in the order: fanumelec > numregim > size > popn > pctvote. With this process we went from a R squared value of 0.5652689 to 0.5017707, but reduced the formula from eight factors to three. The fitted values against the residuals look the same as before.

```
africaglm2=glm(miltcoup~oligarchy+pollib+parties, family=poisson,data=africa)
with(summary(africaglm2), 1 - deviance/null.deviance)
```

```
## [1] 0.5017707
```

```
summary(africaglm2)
```

```
##
## Call:
## glm(formula = miltcoup ~ oligarchy + pollib + parties, family = poisson,
##      data = africa)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -1.3583  -1.0424  -0.2863   0.6278   1.7517
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  0.251377   0.372689   0.674  0.50000
## oligarchy    0.092622   0.021779   4.253 2.11e-05 ***
## pollib      -0.574103   0.204383  -2.809  0.00497 **
## parties      0.022059   0.008955   2.463  0.01377 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
##      Null deviance: 65.945  on 35  degrees of freedom
## Residual deviance: 32.856  on 32  degrees of freedom
## AIC: 105.66
##
## Number of Fisher Scoring iterations: 5
```

```
plot(log(fitted(africaglm2)),residuals(africaglm2))
```

