

SPBsurvival.R

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2023-11-14

```
# SPBsurvival.R
# Multiple regression for SPB survival data

# Load necessary libraries
library(ggplot2)
library(car)

## Loading required package: carData
library(QuantPsyc)

## Loading required package: boot
##
## Attaching package: 'boot'
## The following object is masked from 'package:car':
##
##      logit
## Loading required package: MASS
##
## Attaching package: 'QuantPsyc'
## The following object is masked from 'package:base':
##
##      norm

# Read in data set
SPB <- read.table(header=T,colClasses=rep("numeric",3),text="
satkden blueden survival
1.250 0.000 0.107
2.656 0.481 0.715
7.334 0.171 0.036
1.603 0.352 0.188
2.622 0.016 0.438
1.000 0.000 0.585
4.342 0.185 0.115
5.233 0.018 0.257
2.500 0.410 0.032
3.250 0.015 0.350
6.000 0.007 0.161
4.750 0.000 0.073
2.500 0.095 0.219
8.750 0.033 0.028
```

```

6.000 0.015 0.294
5.000 0.105 0.207
7.149 0.025 0.227
6.750 0.015 0.040
7.500 0.043 0.089
2.500 0.073 0.176
5.000 0.055 0.084
2.250 0.023 0.203
1.250 0.123 0.074
4.750 0.035 0.126
4.500 0.212 0.290
9.557 0.166 0.010
5.000 0.338 0.207
")

# Apply transformations here
SPB <- transform(SPB,y=log(survival))

# Print data
SPB

```

```

##      satkden blueden survival      y
## 1      1.250   0.000   0.107 -2.2349264
## 2      2.656   0.481   0.715 -0.3354727
## 3      7.334   0.171   0.036 -3.3242363
## 4      1.603   0.352   0.188 -1.6713133
## 5      2.622   0.016   0.438 -0.8255364
## 6      1.000   0.000   0.585 -0.5361434
## 7      4.342   0.185   0.115 -2.1628232
## 8      5.233   0.018   0.257 -1.3586792
## 9      2.500   0.410   0.032 -3.4420194
## 10     3.250   0.015   0.350 -1.0498221
## 11     6.000   0.007   0.161 -1.8263509
## 12     4.750   0.000   0.073 -2.6172958
## 13     2.500   0.095   0.219 -1.5186835
## 14     8.750   0.033   0.028 -3.5755508
## 15     6.000   0.015   0.294 -1.2241755
## 16     5.000   0.105   0.207 -1.5750365
## 17     7.149   0.025   0.227 -1.4828053
## 18     6.750   0.015   0.040 -3.2188758
## 19     7.500   0.043   0.089 -2.4191189
## 20     2.500   0.073   0.176 -1.7372713
## 21     5.000   0.055   0.084 -2.4769385
## 22     2.250   0.023   0.203 -1.5945493
## 23     1.250   0.123   0.074 -2.6036902
## 24     4.750   0.035   0.126 -2.0714734
## 25     4.500   0.212   0.290 -1.2378744
## 26     9.557   0.166   0.010 -4.6051702
## 27     5.000   0.338   0.207 -1.5750365

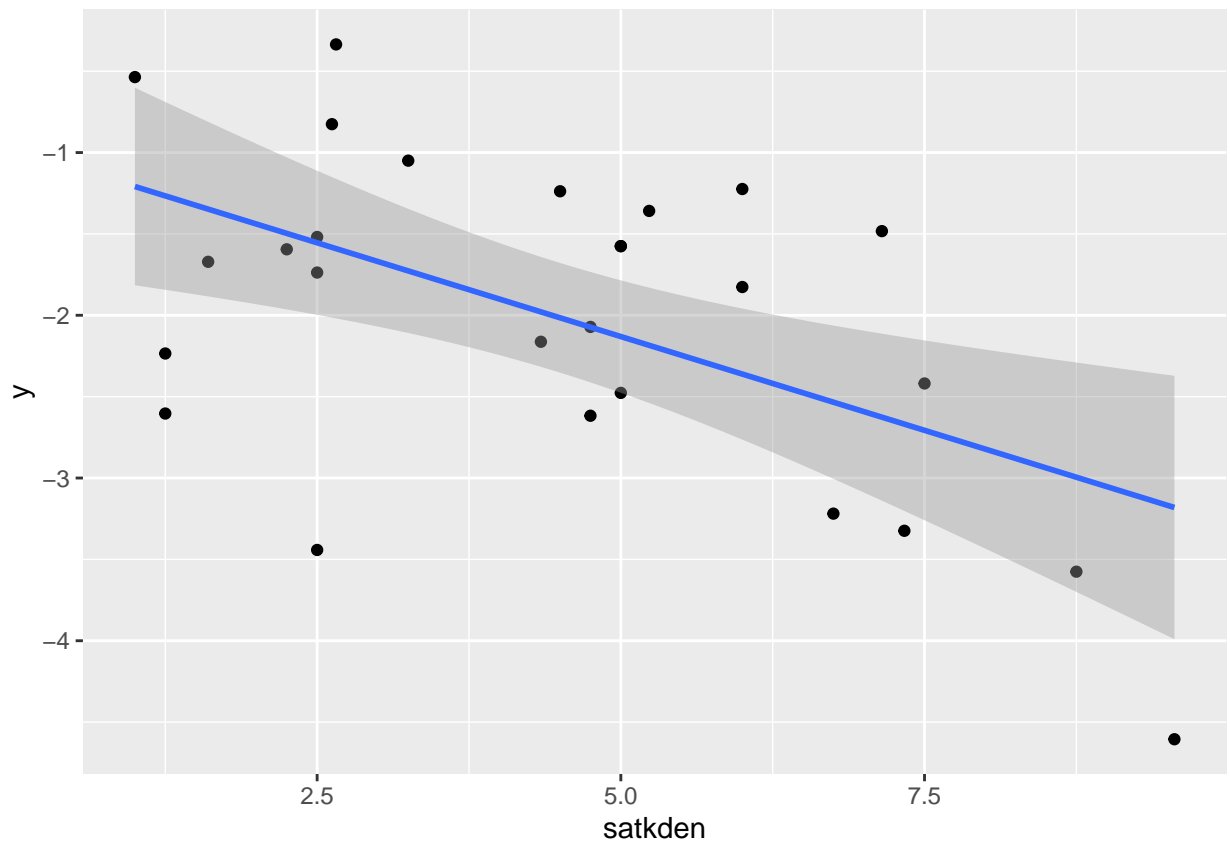
```

```

# Graphics using ggplot2
ggplot(SPB,aes(satkden,y))+
geom_point()+
stat_smooth(method="lm")

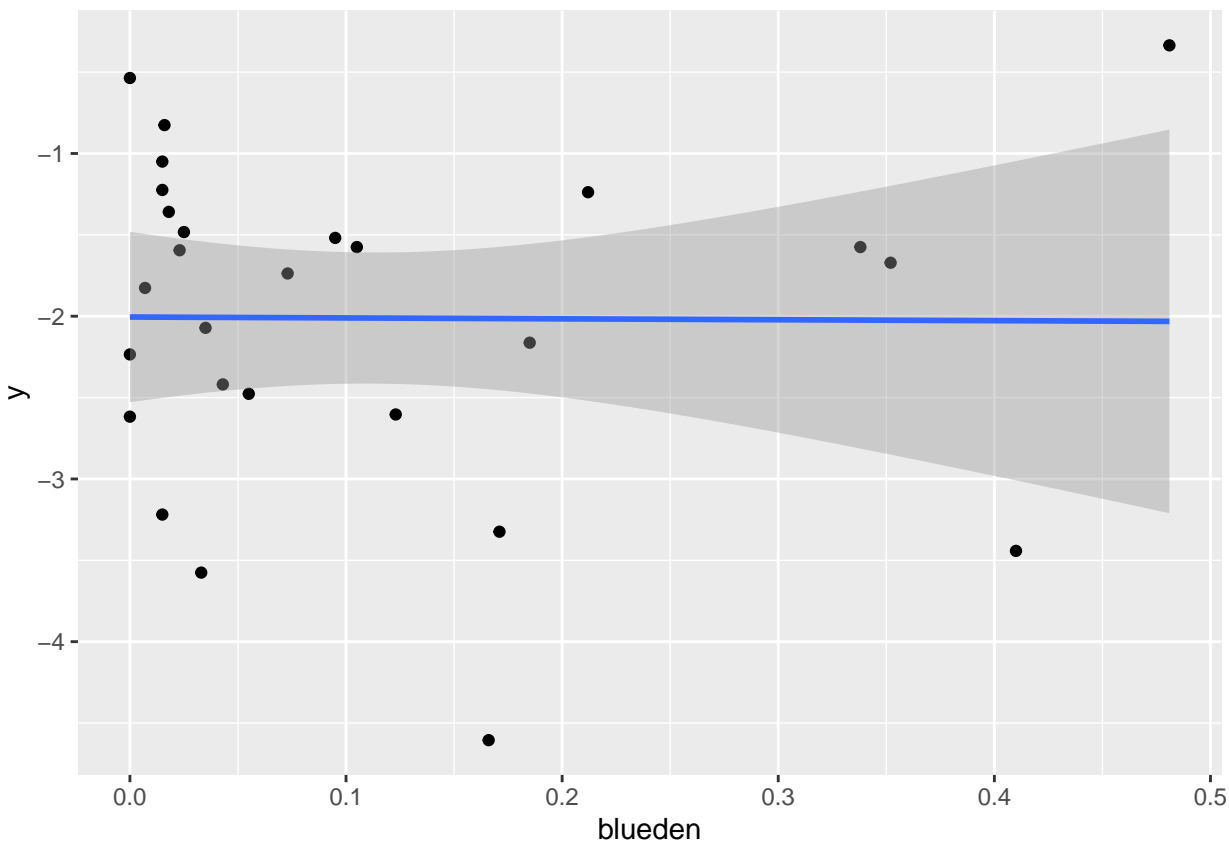
```

```
## `geom_smooth()` using formula = 'y ~ x'
```



```
ggplot(SPB,aes(blueden,y))+  
geom_point()+  
stat_smooth(method="lm")
```

```
## `geom_smooth()` using formula = 'y ~ x'
```



```
# Multiple regression
regout <- lm(y~satkden+blueden,data=SPB)
summary(regout)

##
## Call:
## lm(formula = y ~ satkden + blueden, data = SPB)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.66284 -0.59529 -0.05806  0.62632  1.53848
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.84961    0.41094  -2.067  0.04964 *
## satkden      -0.23905    0.07244  -3.300  0.00301 **
## blueden      -0.80964    1.25300  -0.646  0.52431
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8606 on 24 degrees of freedom
## Multiple R-squared:  0.3122, Adjusted R-squared:  0.2548
## F-statistic: 5.446 on 2 and 24 DF,  p-value: 0.01122

# 95% confidence intervals for regression coefficients
confint(regout)
```

```
##           2.5 %      97.5 %
## (Intercept) -1.6977520 -0.001459873
## satkden      -0.3885525 -0.089540616
## blueden      -3.3957149  1.776430564
```

```
# Standardized regression coefficients
lm.beta(regout)
```

```
##      satkden      blueden
## -0.5681854 -0.1112547
```

```
# Tolerance values (1/vif)
tol <- 1/vif(regout)
tol
```

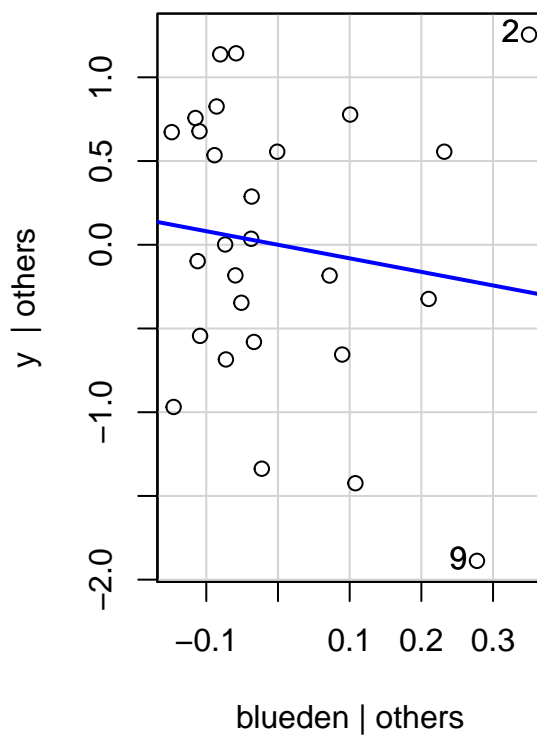
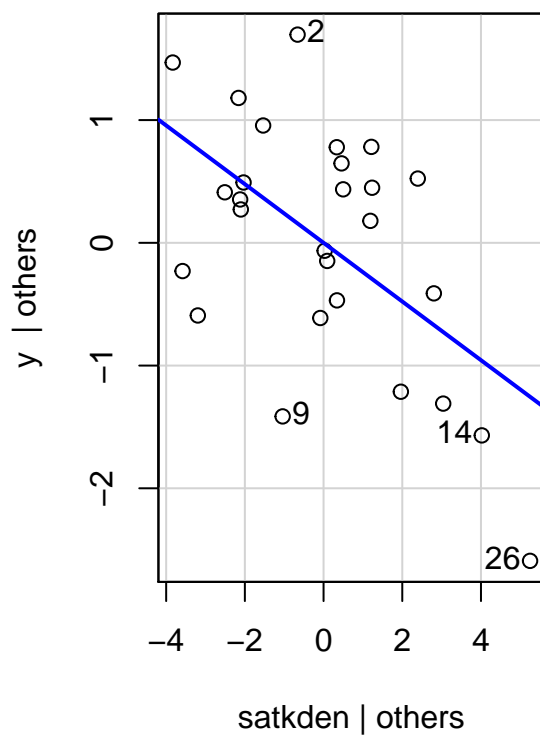
```
##      satkden      blueden
## 0.9667611 0.9667611
```

```
# Variance inflation factors
vif(regout)
```

```
##      satkden      blueden
## 1.034382 1.034382
```

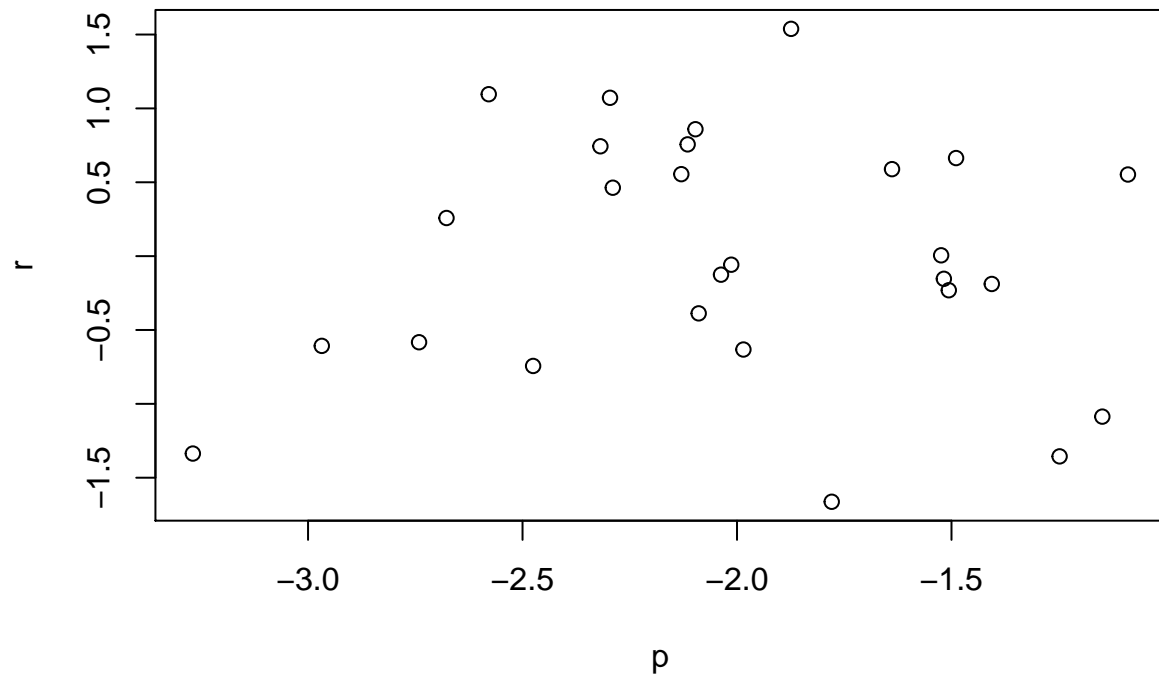
```
# Residual-residual plots
avPlots(regout)
```

Added-Variable Plots



```
# Diagnostic plots to check regression assumptions
p <- predict(regout)
r <- resid(regout)
```

```
plot(p,r)
```



```
qqnorm(r)
```

Normal Q-Q Plot

