# Statistik in R

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# Deskriptive Statistik

# Daten laden

```
atlant <- read.csv(
  "../data/AtlantData1.csv",
  sep = "\t",
  header = TRUE)

head(atlant)
```

```
##   site      X       Y archont feature      object class sherd qty
## 1    A 472564 3939619   Atlas surface                K     G   1  5
## 2    A 472564 3939619   Atlas       1           2     K     G   1 20
## 3    A 472564 3939619   Atlas       1      -1,2:2     K     R   1
## 4    A 472564 3939619   Atlas       1 3, -1-3-1:3     K     R   1  6
## 5    A 472564 3939619   Atlas       1     2, -1:2     K     G   1  9
## 6    A 472564 3939619   Atlas       1  -1:4, -2:4     K     G   1 19
##   size wall muendungsD muendungsH minD minD_H maxD maxD_H bodenD
## 1  200   NA       17.0        9.0   NA     NA   16    2.5      0
## 2  500    6       27.5       21.0 23.5   17.0   27    8.5      0
## 3  120    7       21.0       13.0 18.5   11.5   19   11.0     NA
## 4  500    8       29.0       16.0 23.5   11.0   25    8.0     NA
## 5  500    8       23.5        8.5   NA     NA   24    3.0      0
```

# Standardfunktionen

```
min(atlant$muendungsD)
```

```
## [1] NA
```

*Bei Variablen mit NaN muss dies R mitgeteilt werden!*

```
min(atlant$muendungsD, na.rm = TRUE)
```

```
## [1] 5
```

```
max(atlant$muendungsD, na.rm = TRUE)
```

```
## [1] 35
```

# Lageparameter

```
mean(atlant$wt)
```

```
## [1] 395.3333
```

```
median(atlant$wt)
```

```
## [1] 153.5
```

*Eine wichtige Eigenschaft des Medians ist Robustheit gegenüber Ausreißern!*

```
summary(atlant$wt)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##     6.0    44.0   153.5   395.3   501.5  4500.0
```

# Streuungsparameter

## Spannweite

```
max(atlant$wt) - min(atlant$wt)
```

```
## [1] 4494
```

## Varianz

```
var(atlant$wt)
```

```
## [1] 392716.4
```

## Standardabweichung

```
sd(atlant$wt)
```

```
## [1] 626.6709
```

# Streuungsparameter

*!!! R Funktionen beruhen auf der korrigierten Stichprobenvarianz !!!*

```
var(atlant$wt)
```

```
## [1] 392716.4
```

**empirische Varianz**

$$var(x) = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}$$

```
(sum( (atlant$wt - mean(atlant$wt) ) ^2) )/(length(atlant$wt) )
```

```
## [1] 389870.6
```

# Konzentrationsparameter

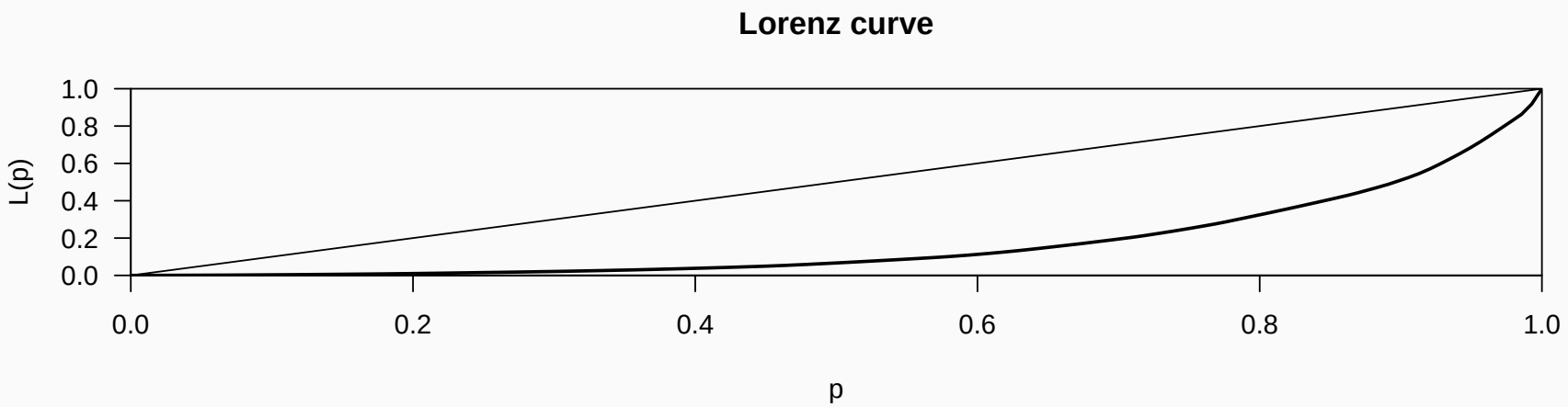
**Gini-Koeffizient** aus der Lorenz-Kurve (Paket: ineq)

```
ineq(atlant$wt,type="Gini")
```

```
## [1] 0.6580198
```

0 = gleichmäßigen Verteilung, 1 = maximaler Ungleichverteilung

```
plot(Lc(atlant$wt))
```



# Schließende Statistik

# Tests auf Lageparameter

```r
t.test(atlant$wt)
```

```
##
##  One Sample t-test
##
## data:  atlant$wt
## t = 7.4108, df = 137, p-value = 1.171e-11
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  289.8458 500.8209
## sample estimates:
## mean of x
##  395.3333
```

```r
head(a, n = 3)
```

```
##   30 70 120 200 500
## A  0  0   1   2   5
## B  0  0   0   2   2
## C  0  1   2   0   1
```

```r
chisq.test(a)
```

```
## Warning in chisq.test(a): Chi-squared approximation may be incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  a
## X-squared = 58.35, df = 28, p-value = 0.0006588
```