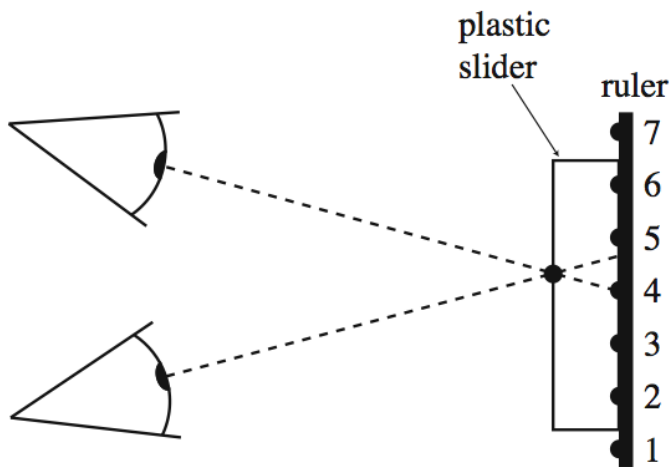
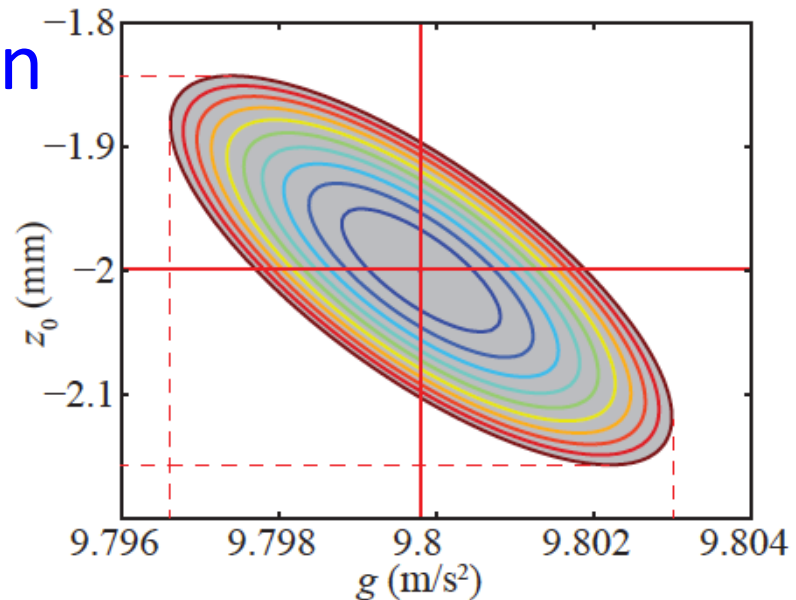


# Einführung in die Datenanalyse



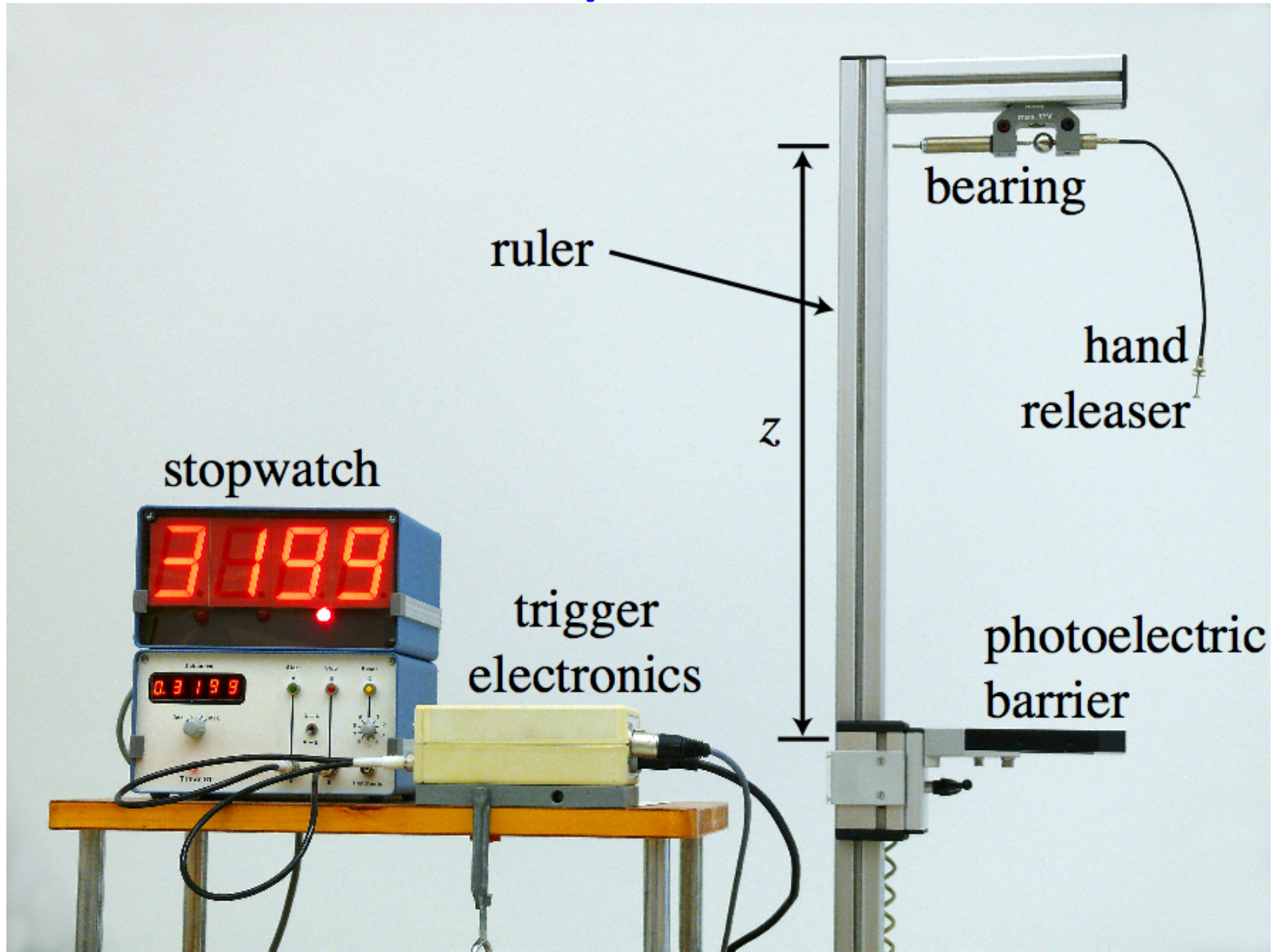
Thomas Ihn  
HS 2014



# Vor drei Wochen

- Lineare Regression mit
  - additivem Fehlermodell und
  - normalverteiltem Rauschen

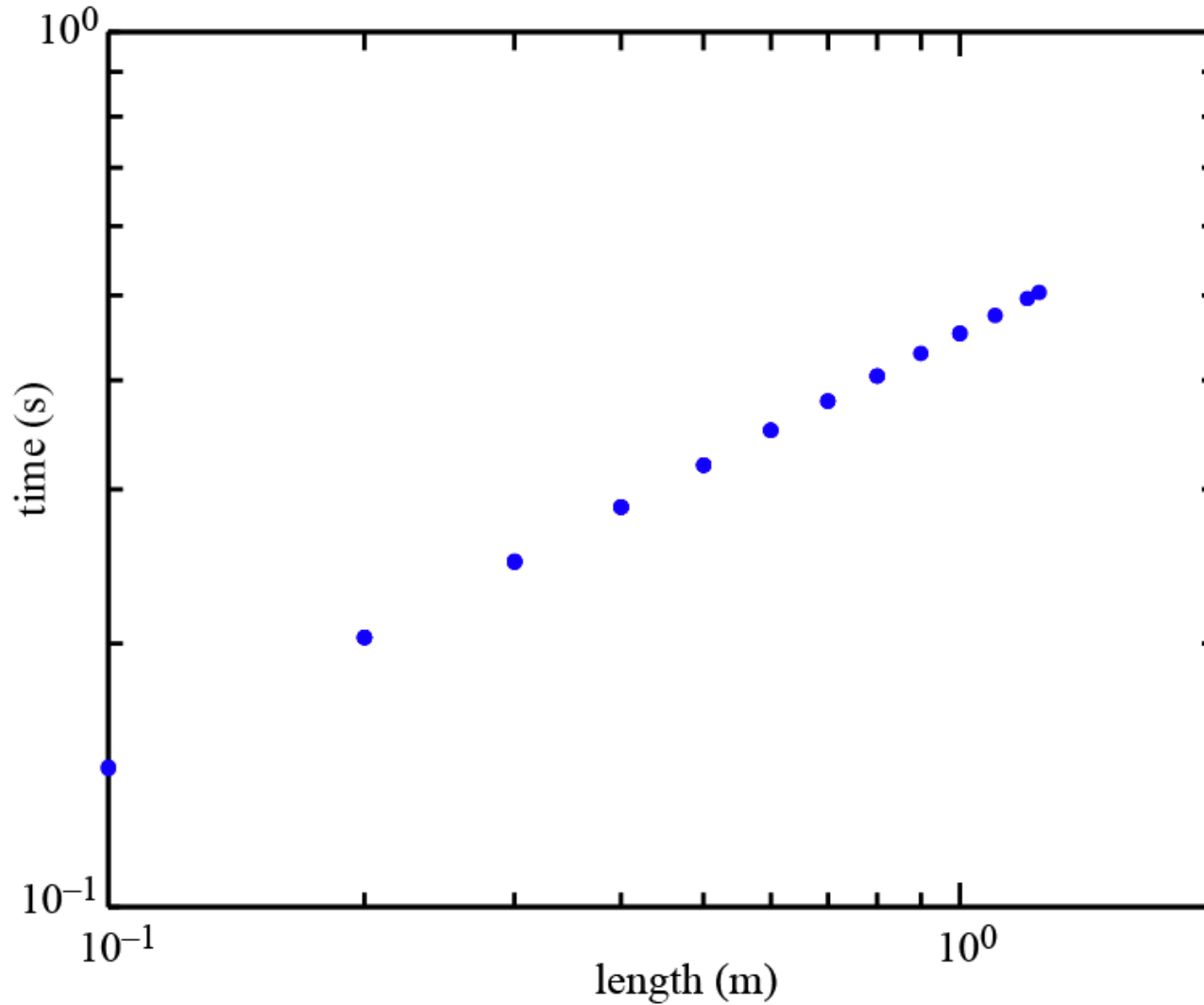
# Das Experiment



# Die gemessenen Daten

z (cm)	t (ms)
10	144.6
10	144.6
10	153.1 (?)
10	143.9
20	203.2
20	203.1
20	203.2
30	247.9
30	248.3
30	248.2
40	286.3
40	286.5
40	286.3
50	319.9
50	319.6
60	350.2
60	350.8
70	378.5
70	378.5
70	378.4
80	404.4
80	404.2
90	429.2
90	429.1
100	452.1
100	452.5
110	474.4
110	474.3
120	495.5
120	495.4
124	503.6
124	503.5

# Graphische Darstellung



```

data =
  Import[
    "/Users/ihn/Documents/Teaching/VP-Leitung/DataAnalysis/2013NewProgram/
    Lectures given in 2013/7. Lecture/Data_z_t.csv"]

```

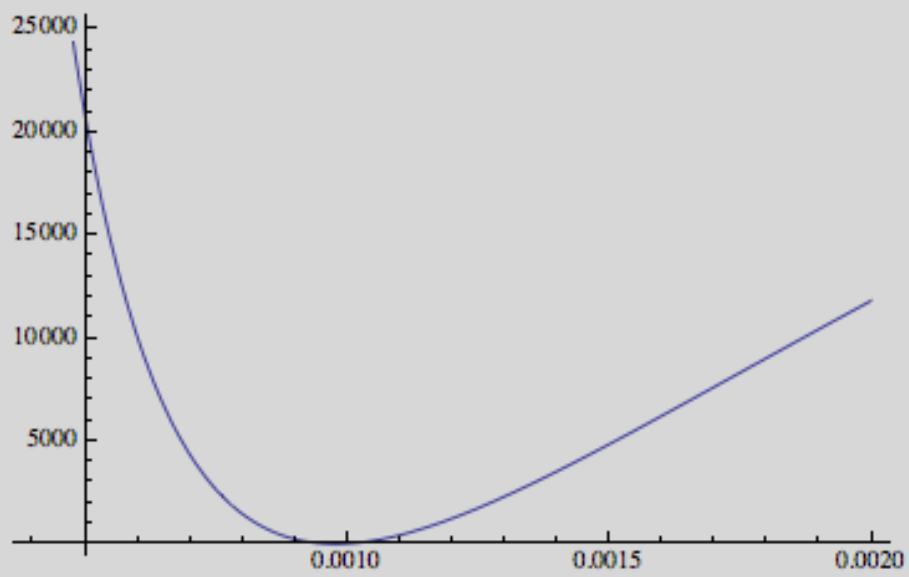
```

{{10, 144.6}, {10, 144.6}, {10, 143.9}, {20, 203.2}, {20, 203.1}, {20, 203.2},
 {30, 247.9}, {30, 248.3}, {30, 248.2}, {40, 286.3}, {40, 286.5},
 {40, 286.3}, {50, 319.9}, {50, 319.6}, {60, 350.2}, {60, 350.8},
 {70, 378.5}, {70, 378.5}, {70, 378.4}, {80, 404.4}, {80, 404.2},
 {90, 429.2}, {90, 429.1}, {100, 452.1}, {100, 452.5}, {110, 474.4},
 {110, 474.3}, {120, 495.5}, {120, 495.4}, {124, 503.6}, {124, 503.5}}

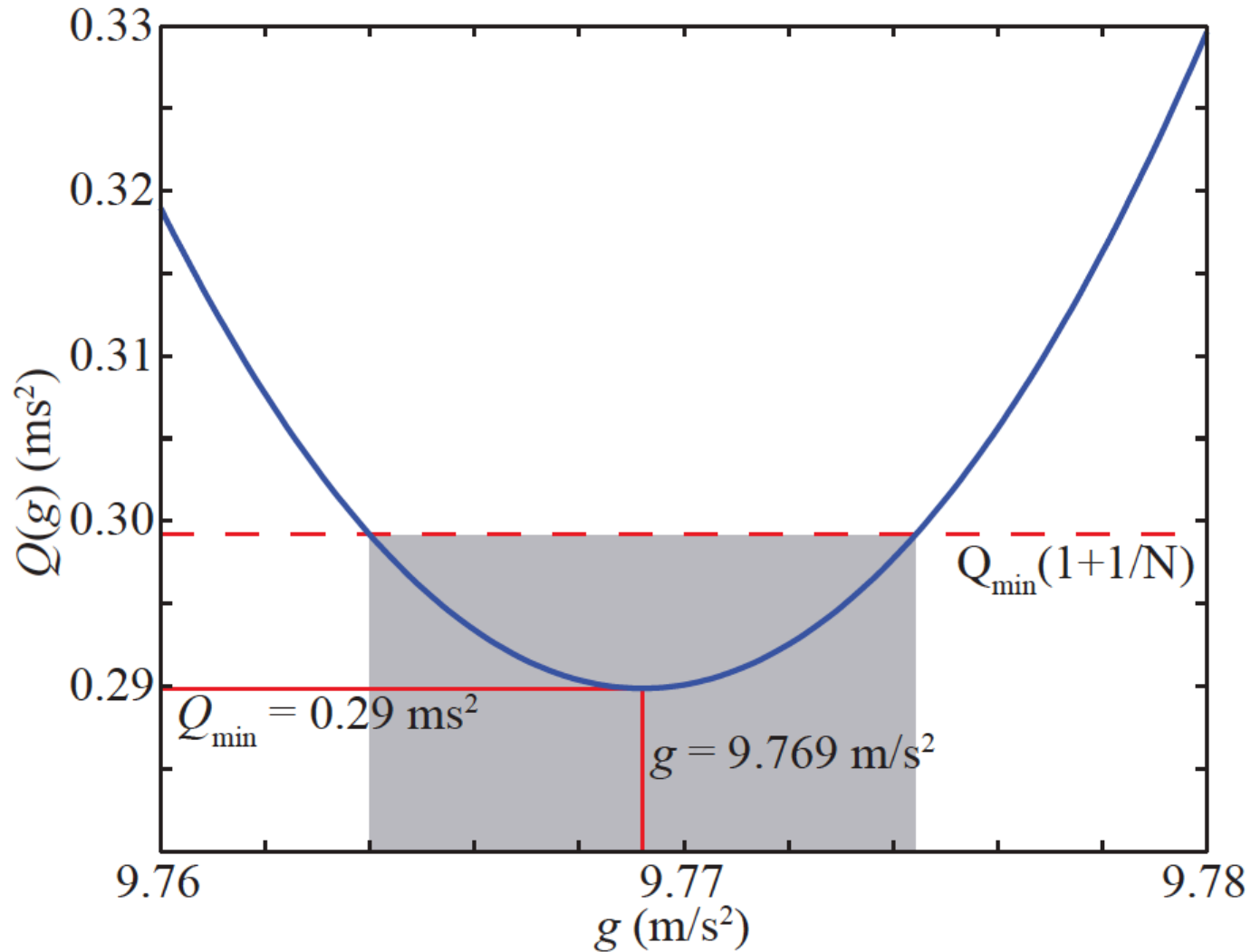
```

$$Q[g, data] := \frac{1}{\text{Length}[data]} \sum_{j=1}^{\text{Length}[data]} \left( data[[j, 2]] - \sqrt{\frac{2 \text{data}[[j, 1]]}{g}} \right)^2$$

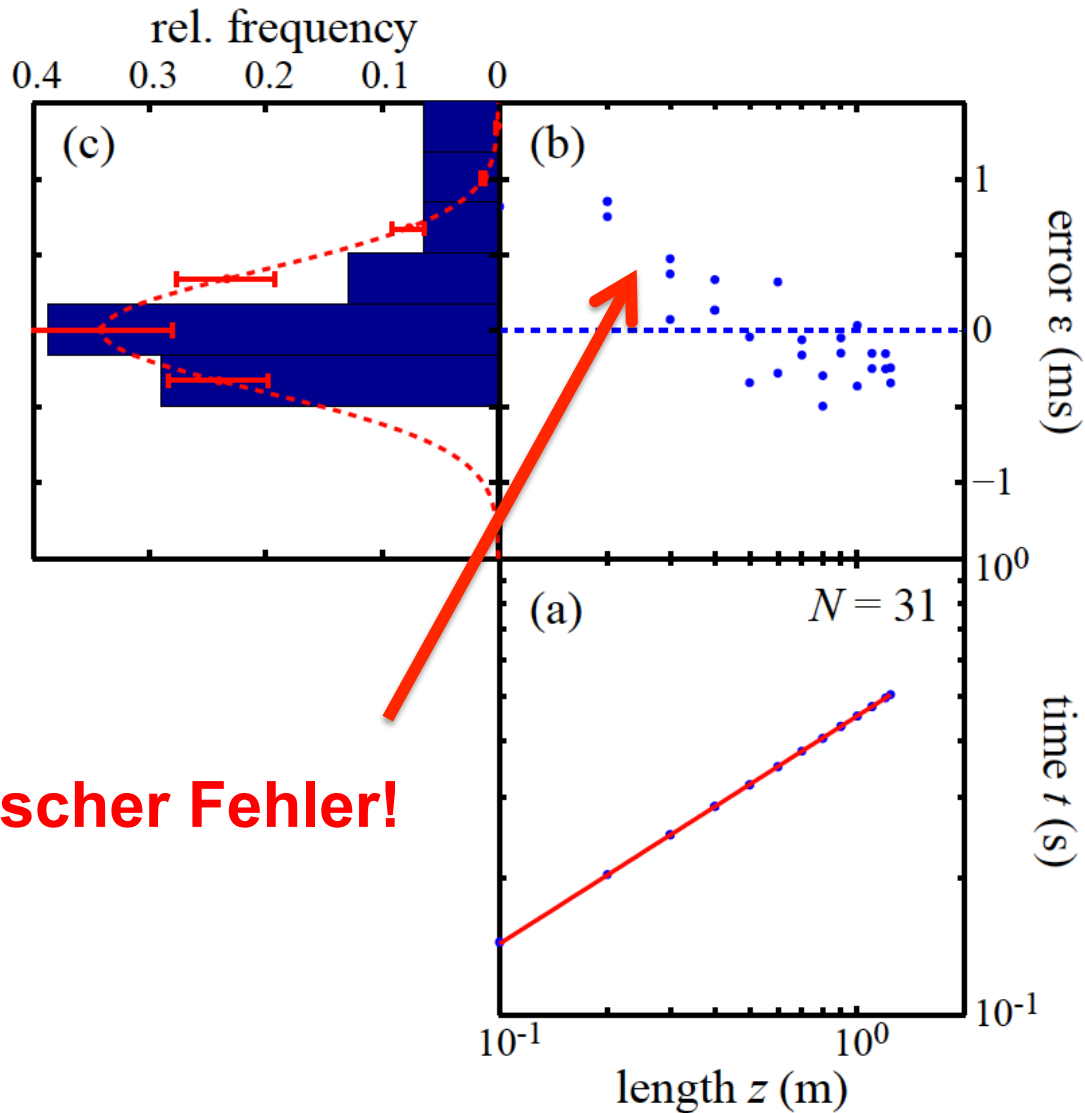
```
Plot[Q[g, data], {g, 0.0004, 0.002}]
```



# Mittlerer quadratischer Fehler



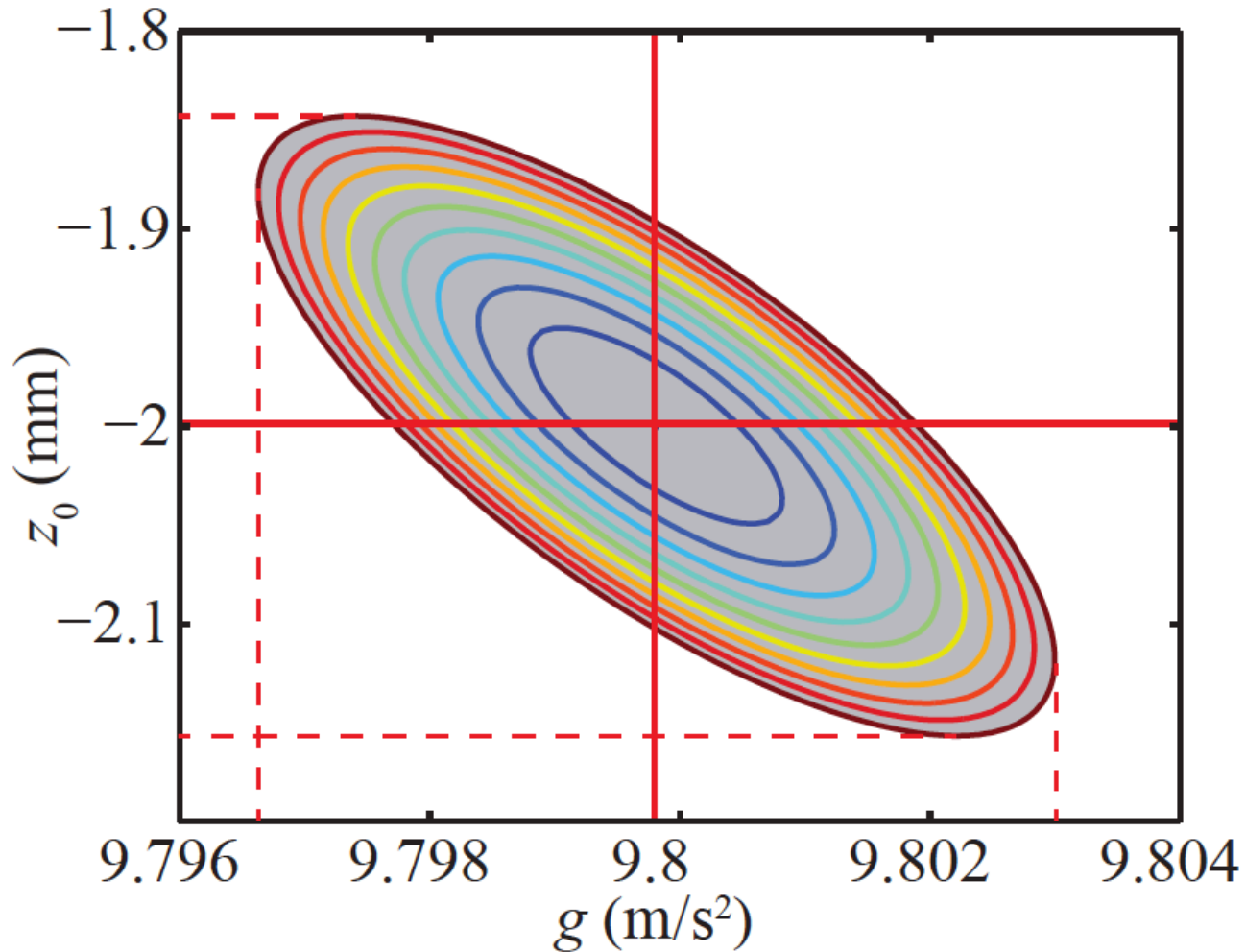
# Zusammenfassung der Datenanalyse



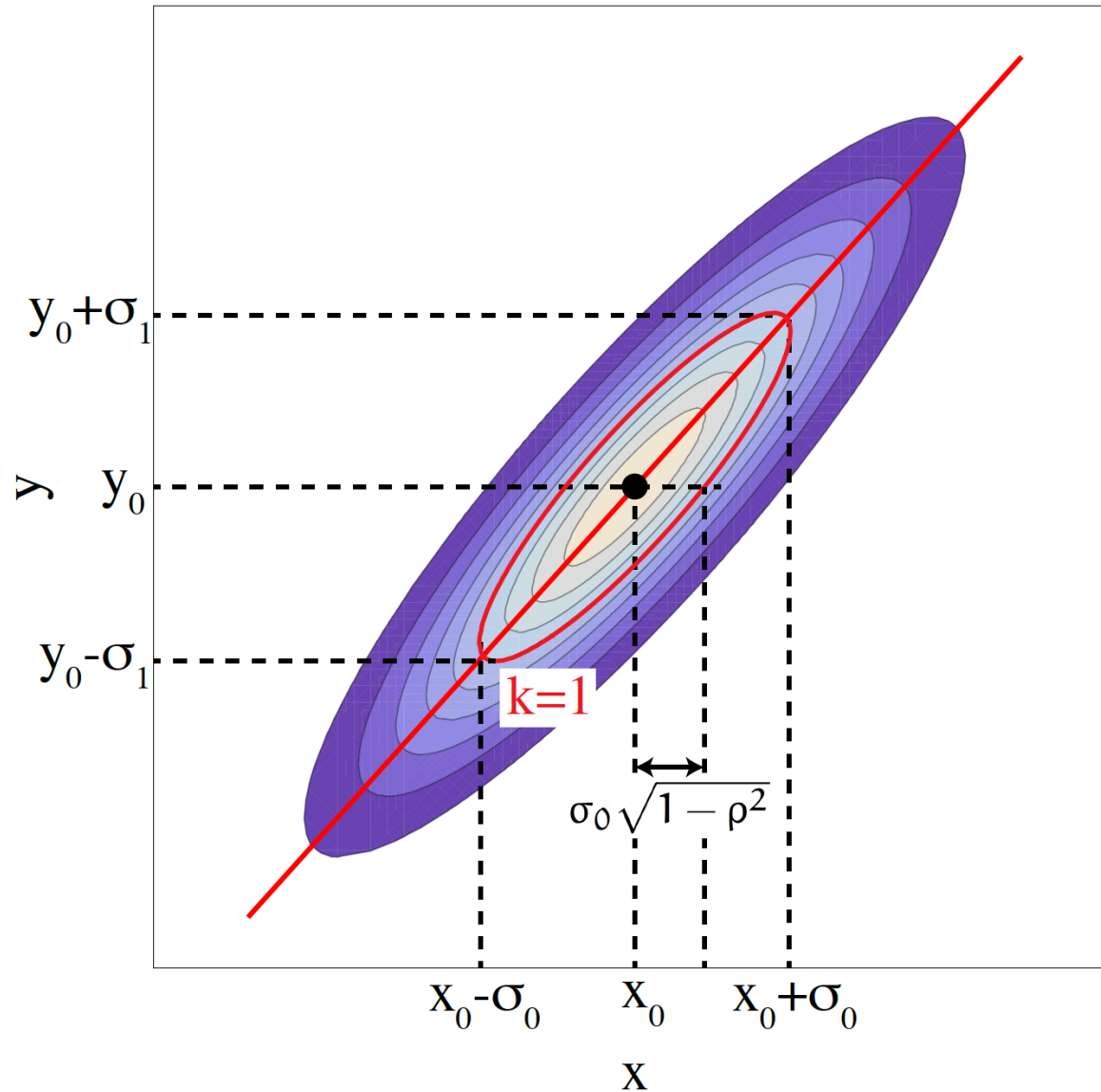
**systematischer Fehler!**



# Höhenlinien von $Q(g, z_0)$



# Fehler graphisch bestimmen



# Darstellung der Datenanalyse

