```
> #twee onder 1 kap woningen (1121)
> xdata0=c(100,120,145)
> ydata0=c(1766.24249594603,1650.55700908023,1522.17241432737)
> xdata=xdata0
> ydata=ydata0
>
> ds <- data.frame(y = ydata, x = xdata)
>
> # plot data
> plot(ds$x, ds$y)
> #fit linear model
> fitlm <- lm(y ~  x, data=ds)
>
> # summarise
> summary(fitlm)

Call:
lm(formula = y ~ x, data = ds)

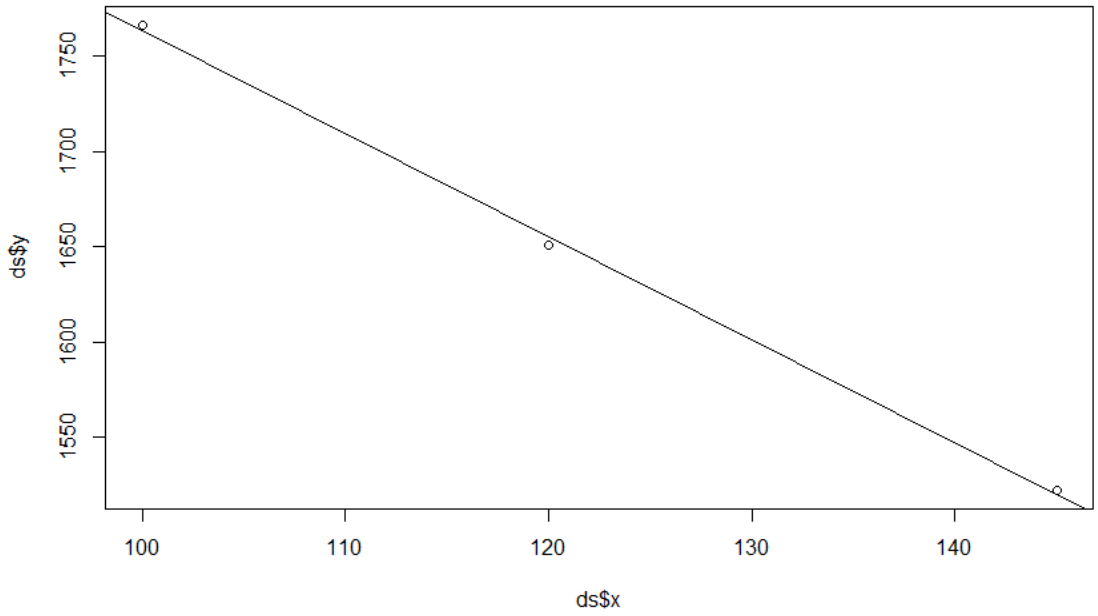
Residuals:
   1    2    3
2.659 -4.787  2.128

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 2304.7791    22.6720  101.66  0.00626 **
x             -5.4120     0.1842  -29.37  0.02167 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 5.875 on 1 degrees of freedom
Multiple R-squared:  0.9988,

Adjusted R-squared:  0.9977
F-statistic: 862.8 on 1 and 1 DF,  p-value: 0.02167

>
> sum(resid(fitlm)^2)
[1] 34.51303
> confint(fitlm)
                2.5 %    97.5 %
(Intercept) 2016.70454 2592.85369
x             -7.75305   -3.07087
>
> #draw line
> abline(fitlm)
```



> #tussen woningen laagbouw (1131)

```
> xdata1=c(30,50,60,75,95,115,150,200,250)
>
ydata1=c(2880.83586000454,2102.43191493536,1977.47412545155,1730.90138371064,1503.443
3811707,1398.0539014757,1224.95488241522,1164.02301284975,1044.20283822665)
> xdata=xdata1
> ydata=ydata1
>
> ds <- data.frame(y = ydata1, x = xdata1)
>
> # plot data
> plot(ds$x, ds$y)
>
> # fit non-linear model
> fit <- nls(y ~ exp(a + b * x ) + c, data = ds, start = list(a = 7.964287, b = - 0.005393, c=0))
>
> # summarise
> summary(fit)

Formula: y ~ exp(a + b * x) + c

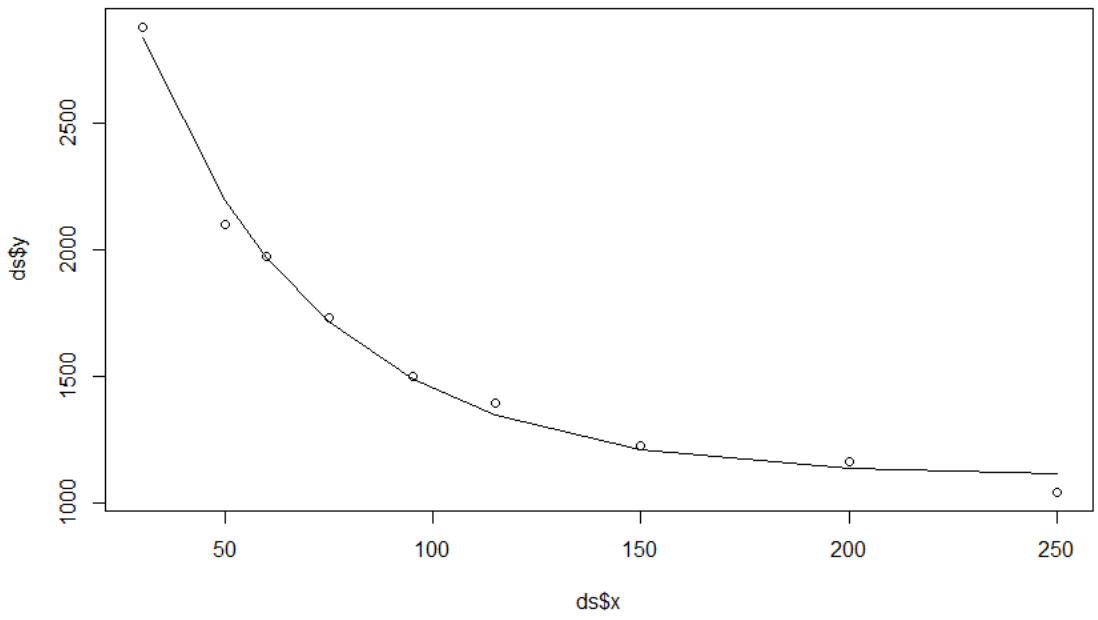
Parameters:
   Estimate Std. Error t value Pr(>|t|)
a  8.152e+00  6.538e-02  124.69 1.79e-11 ***
b -2.309e-02  1.865e-03  -12.38 1.69e-05 ***
c  1.103e+03  4.054e+01   27.21 1.63e-07 ***
```

```
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 56.92 on 6 degrees of freedom

Number of iterations to convergence: 9
Achieved convergence tolerance: 1.795e-06

>
> #draw curve fit
> new = data.frame(xdata = seq(min(xdata),max(xdata),len=200))
> lines(ds$x,predict(fit,newdata=new))
>
>
> sum(resid(fit)^2)
[1] 19440.21
> confint(fit)
Waiting for profiling to be done...
        2.5%       97.5%
a   7.99199447    8.32746819
b  -0.02832603   -0.01857116
c 993.45640551 1200.29550160
>
```



```
> #Drive - in woningen (1138)
> xdata2=c(95,115,150,200,250)
>
ydata2=c(1677.99894850036,1549.59706222918,1426.18007188734,1262.7227272475,1126.9747
9161324)
> xdata=xdata2
> ydata=ydata2
>
> ds <- data.frame(y = ydata, x = xdata)
>
> # plot data
> plot(ds$x, ds$y)
> fit <- nls(y ~ exp(a + b * x ) + c, data = ds, start = list(a = 8.152e+00, b = -2.309e-02, c=1.103e+03))
> summary(fit)

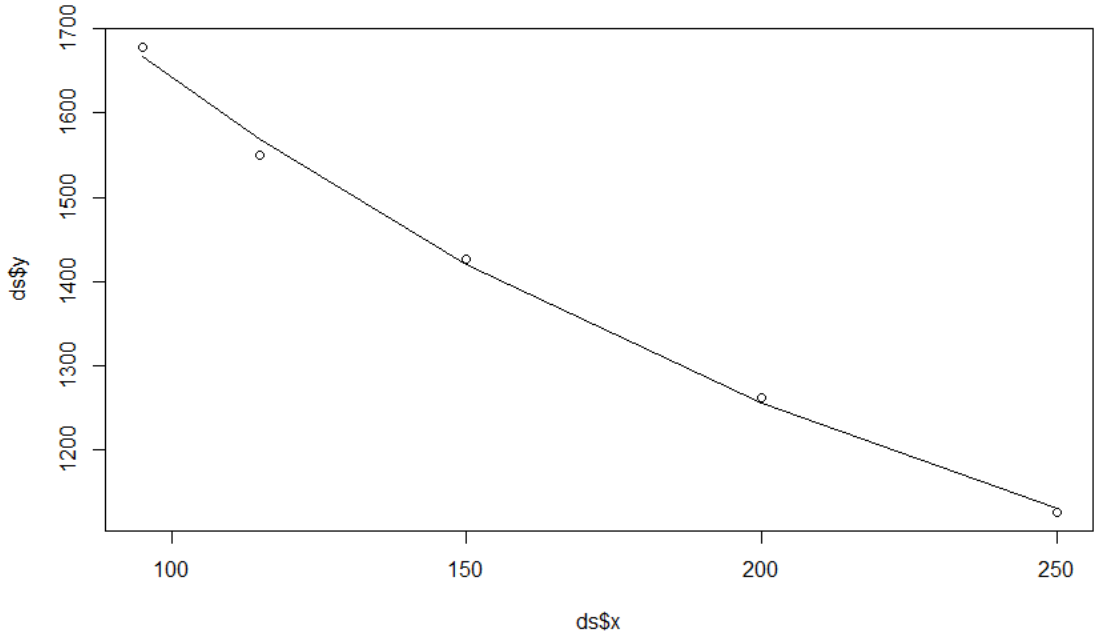
Formula: y ~ exp(a + b * x) + c

Parameters:
   Estimate Std. Error t value Pr(>|t|)
a   7.358224   0.047705 154.244  4.2e-05 ***
b  -0.005709   0.001883  -3.032   0.0937 .
c 754.696461 198.788504   3.796   0.0629 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 16.94 on 2 degrees of freedom

Number of iterations to convergence: 7
Achieved convergence tolerance: 1.595e-06

> sum(resid(fit)^2)
[1] 574.0722
> confint(fit)
Waiting for profiling to be done...
Error in prof$getProfile() : number of iterations exceeded maximum of 50
>
> #draw curve fit
> new = data.frame(xdata = seq(min(xdata),max(xdata),len=200))
> lines(ds$x,predict(fit,newdata=new))
>
```


ds$y
1200
1300
1400
1500
1600
1700
100
150
200
250
ds$x