

Skabelon og ideer til opstilling af proportionel regression af data

restart : with(Gym) : with(plots) :

Skriver data i lister:

$X := [0, 20.08, 40.18, 70.14, 90.25, 120.27, 140.60, 170.32, 190.46, 220.39, 240.54, 270.59] :$

$Y := [0, -1.3, -2.75, -4.8, -6.2, -8.25, -9.67, -11.66, -13.04, -15.18, -16.5, -18.54] :$

Bestemmer k for bedste proportionalitet:

$$\begin{aligned} SK_x &:= 0^2 + 20.08^2 + 40.18^2 + 70.14^2 + 90.25^2 + 120.27^2 + 140.60^2 + 170.32^2 + 190.46^2 \\ &\quad + 220.39^2 + 240.54^2 + 270.59^2 \\ &= 2.942496596 \cdot 10^5 \end{aligned}$$

$$\begin{aligned} SP_{xy} &:= 0 \cdot 0 + 20.08 \cdot (-1.3) + 40.18 \cdot (-2.75) + 70.14 \cdot (-4.8) + 90.25 \cdot (-6.2) + 120.27 \cdot (-8.25) \\ &\quad + 140.60 \cdot (-9.67) + 170.32 \cdot (-11.66) + 190.46 \cdot (-13.04) + 220.39 \cdot (-15.18) \\ &\quad + 240.54 \cdot (-16.5) + 270.59 \cdot (-18.54) \\ &= -20185.3489 \end{aligned}$$

$$k := \frac{SP_{xy}}{SK_x} = -0.06859939593$$

Definerer model:

$$f(x) := k \cdot x :$$

Udregner forklaringsgrad:

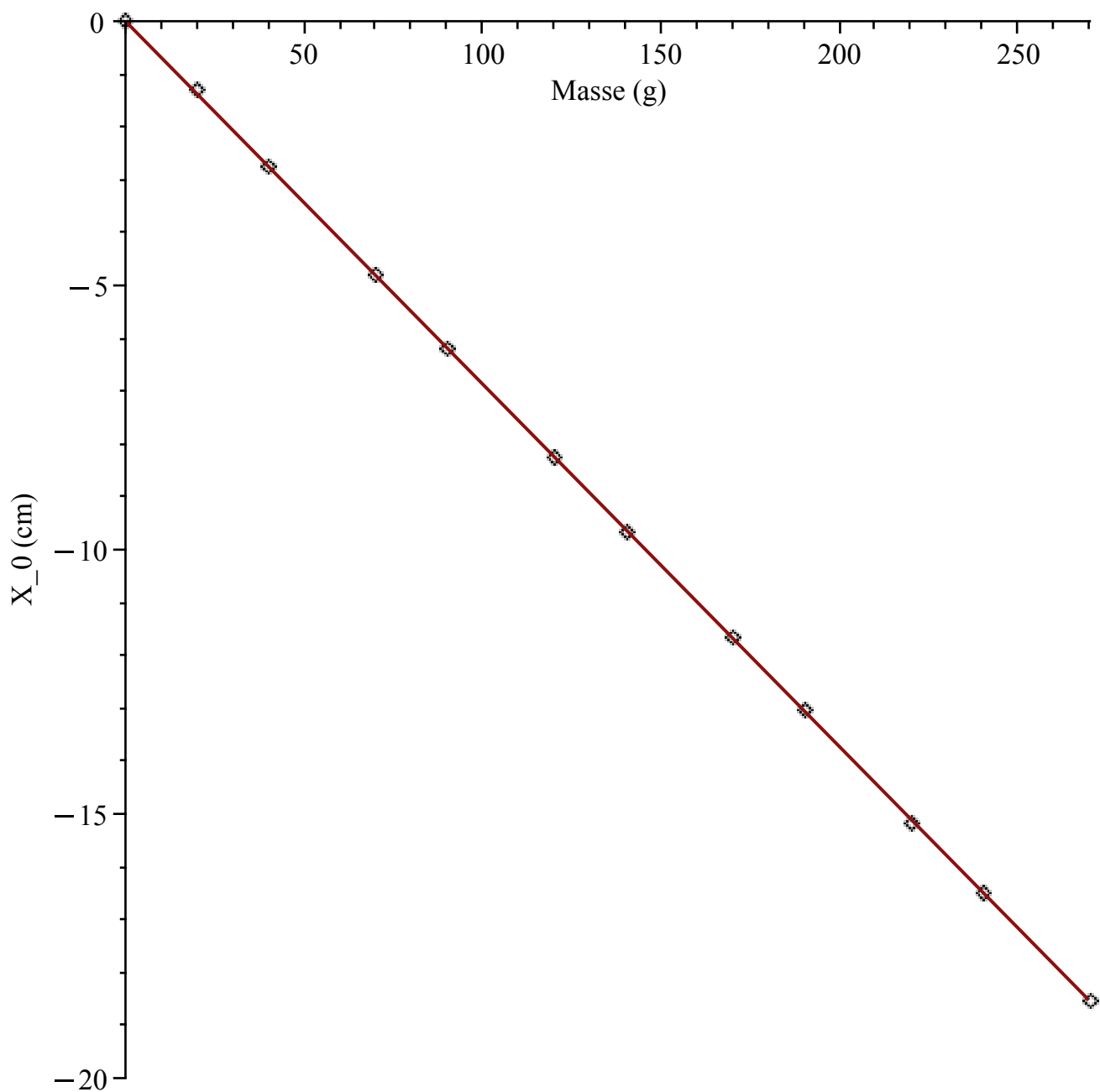
$$\begin{aligned} SK_y &:= 0^2 + (-1.3)^2 + (-2.75)^2 + (-4.8)^2 + (-6.2)^2 + (-8.25)^2 + (-9.67)^2 + (-11.66)^2 \\ &\quad + (-13.04)^2 + (-15.18)^2 + (-16.5)^2 + (-18.54)^2 \\ &= 1384.7151 \end{aligned}$$

$$\begin{aligned} SK_f &:= f(20.08)^2 + f(40.18)^2 + f(70.14)^2 + f(90.25)^2 + f(120.27)^2 + f(140.60)^2 + f(170.32)^2 \\ &\quad + f(190.46)^2 + f(220.39)^2 + f(240.54)^2 + f(270.59)^2 \\ &= 1384.702741 \end{aligned}$$

$$fork := \frac{SK_f}{SK_y} = 0.9999910747$$

Plotter punkter og model (for den kedelige):

$display(pointplot(X, Y), plot(f(x), x = 0..270, y = -20..0), labels = ["Masse (g)", "X_0 (cm)"], labeldirections = ["horizontal", "vertical"])$



Plotter punkter og model (for blærerøven):

```
display( pointplot( X, Y, color = black, symbol = solidcircle ), plot( f( x ), x = 0 ..270, y = - 20 ..0,
    color = red ), labels = [ "Masse (g)", "X__0 (cm)" ], labeldirections = [ "horizontal", "vertical" ],
    axis = [ gridlines ], title = typeset( "Model: %1 \n Forklaringsgrad: %2.", m = k · V, R2 = fork ) )
```

Model: $m = -0.06859939593 \text{ } V$
Forklaringsgrad: $R^2 = 0.9999910747$.

