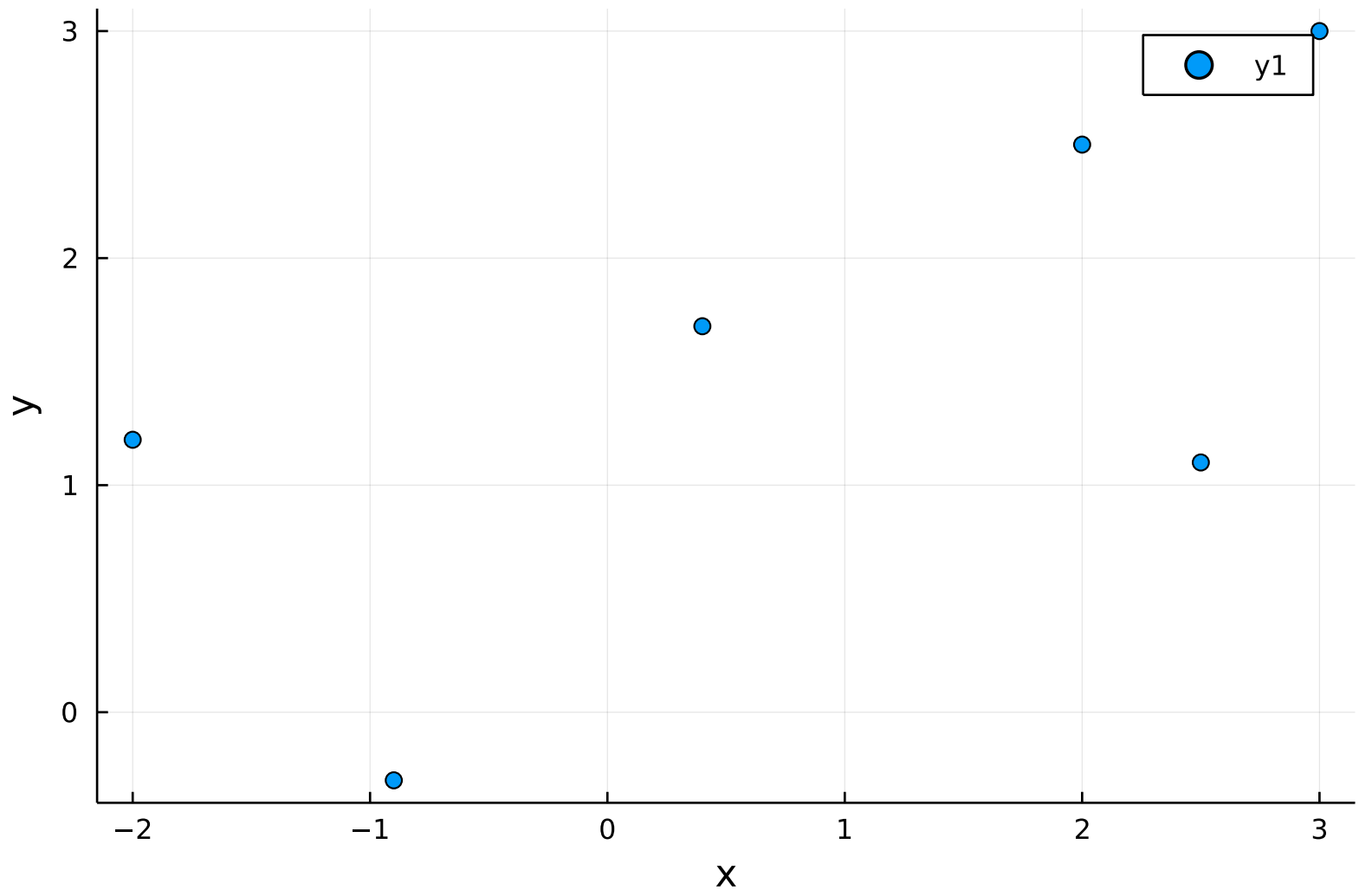
「ガウス過程と機械学習」

P.15 単回帰

In [1]:
```
using LinearAlgebra
using Plots
```

In [2]:
```
x = [-2, -0.9, 0.4, 2.0, 2.5, 3.0]
y = [1.2, -0.3, 1.7, 2.5, 1.1, 3.0]
scatter(x, y, xlab="x", ylab="y")
```

Out[2]:



単回帰の最小二乗法より導出した正規方程式を用いてパラメータa, bを求めてみる。

$$\begin{pmatrix} N & \sum_{n=1}^{N} x_n \\ \sum_{n=1}^{N} x_n & \sum_{n=1}^{N} x_n^2 \end{pmatrix} \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} \sum_{n=1}^{N} y_n \\ \sum_{n=1}^{N} x_n y_n \end{pmatrix}$$

行列要素を計算

In [3]:
```
N = length(x)
sum_x = sum(x)
sum_y = sum(y)
sum_xx = sum(x[n] * x[n] for n in 1:N)
sum_xy = sum(x[n] * y[n] for n in 1:N);
```

パラメータa, bを計算

In [4]:
```
X = [
    N      sum_x
    sum_x sum_xx
]

Y = [
    sum_y
    sum_xy
]

param = inv(X) * Y
```

Out[4]:
```
2-element Vector{Float64}:
 1.2161236702127656
 0.380651595744681
```

求めたパラメータを用いて作図

In [5]:
```
a = param[1]
b = param[2]
scatter(x, y, xlab="x", ylab="y", label="Observed data")
plot!(x -> a + b * x, -2:3, label="linear")
```

Out[5]:

In [ ]:
```

```