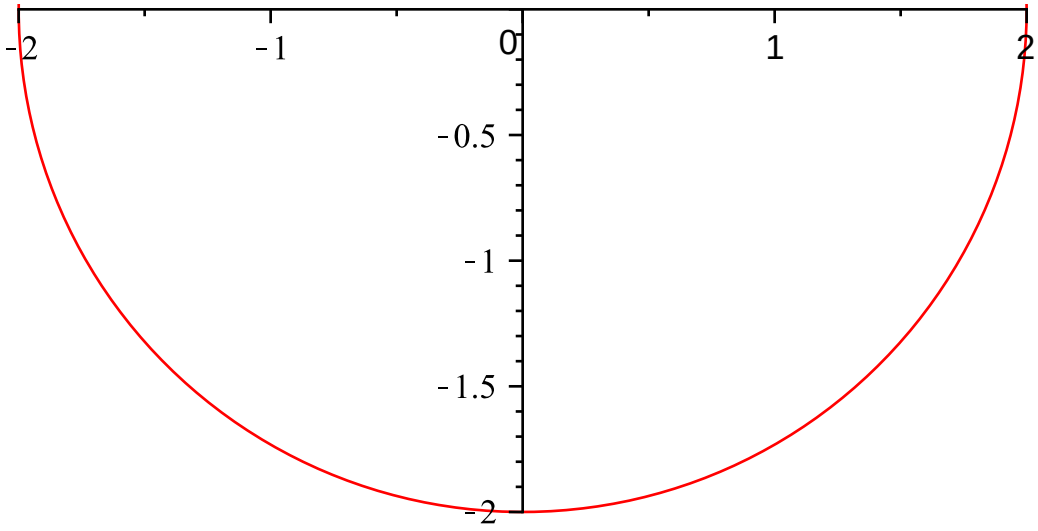
Load from web stuff is here.

This is **text mode** with some math coming now $\left(\frac{x^2}{\sin\left(\frac{2\,\partial f}{\partial x} \right)} \cdot x_4 \right)$

```
> plot( [ 2*cos(t), 2*sin(t), t=0..2*Pi],
    view=[-2..2, -2..0], scaling=constrained);
```



> this is green bold stuff.

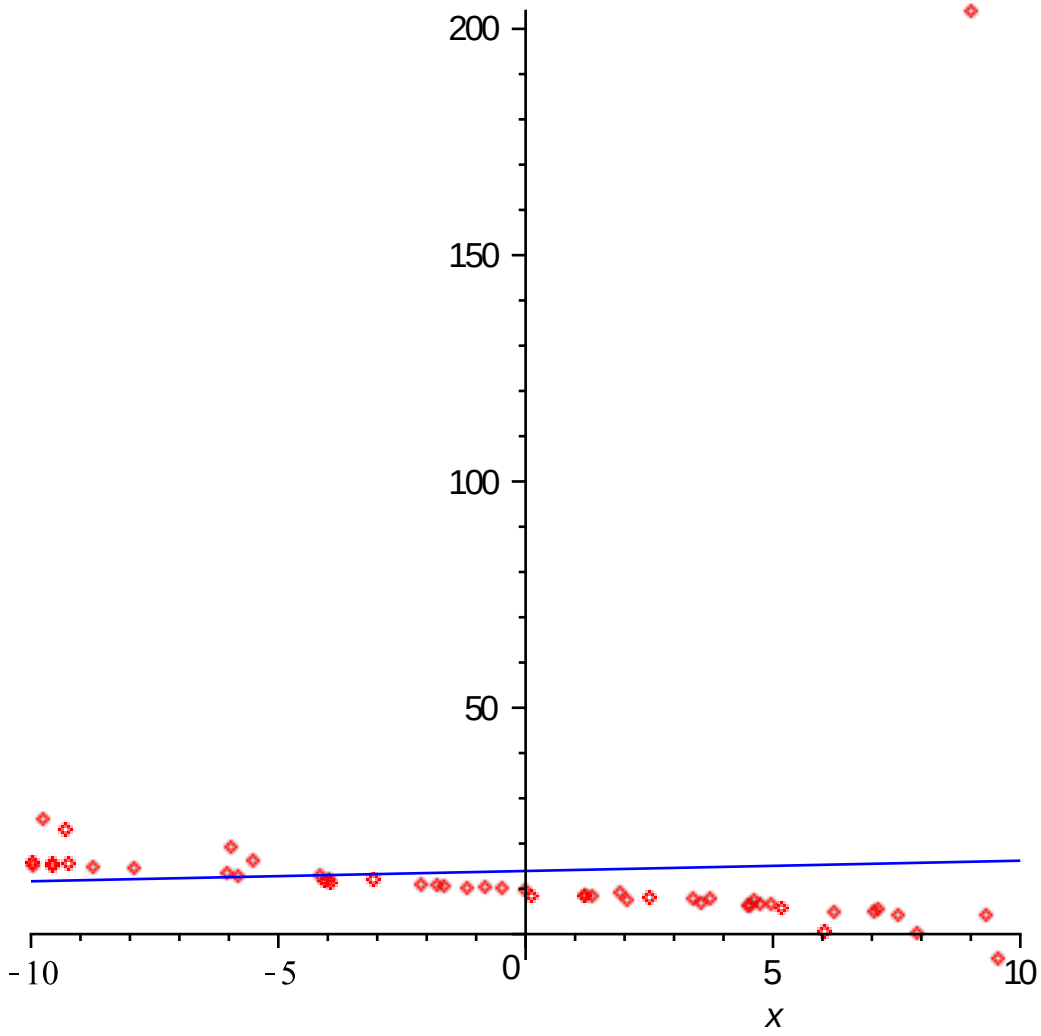
```
> x[3];
```

$$x_3 \quad (1)$$

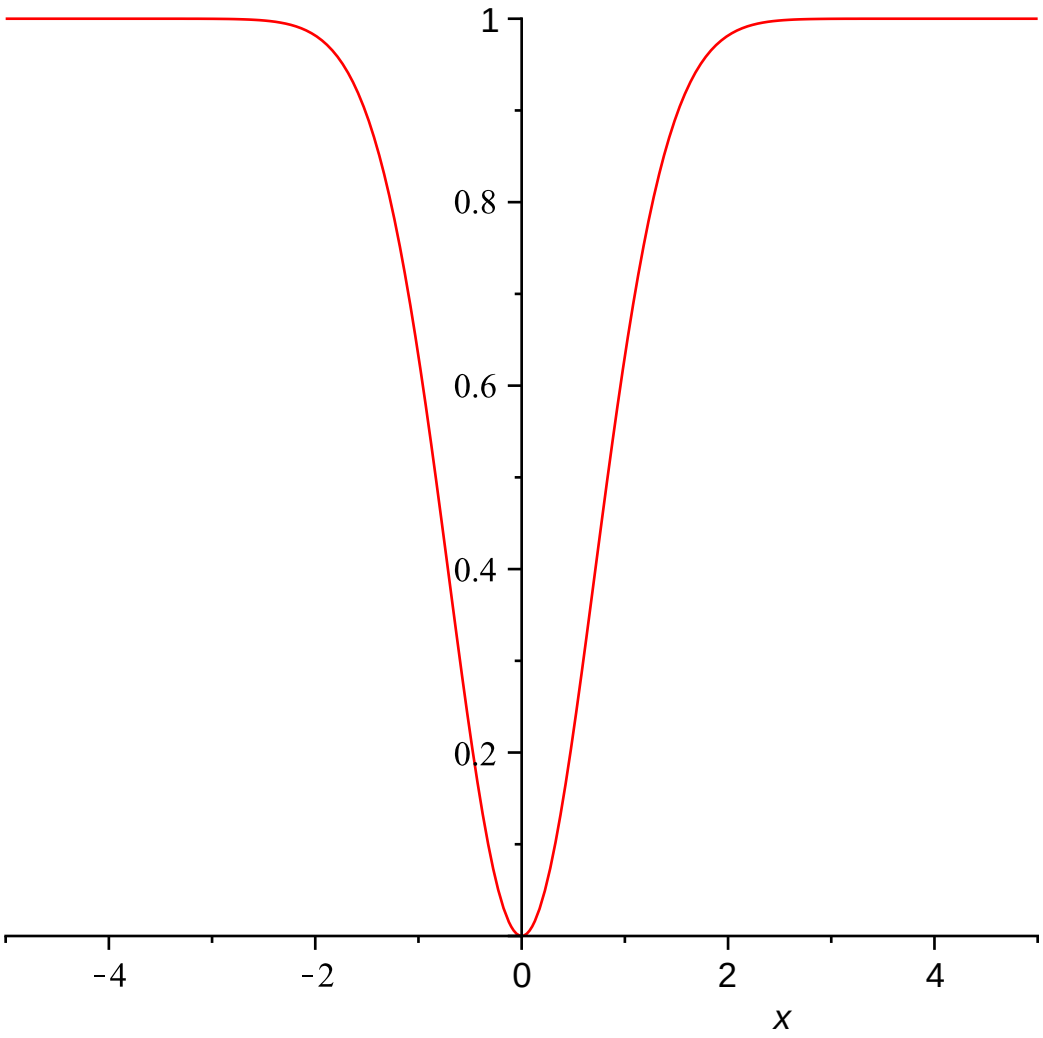
```
> ReadFromWeb(cat(prefix,"lsq_data.txt"));
  with(CurveFitting):
defined set_seed(s), line_pts(), bad_line_pts(), quadratic_pts
(), exp_pts(), cubic_pts(), and circle_pts()
> data:=bad_line_pts();
  plot([data, LeastSquares(data,x)],x=-10..10,style=[point,line],
  color=[red,blue]);
```

data := [[-5.818106482, 12.77212553], [-0.818076106, 10.32993747], [-3.978311906, 12.22404227], [-1.652874364, 10.66471126],

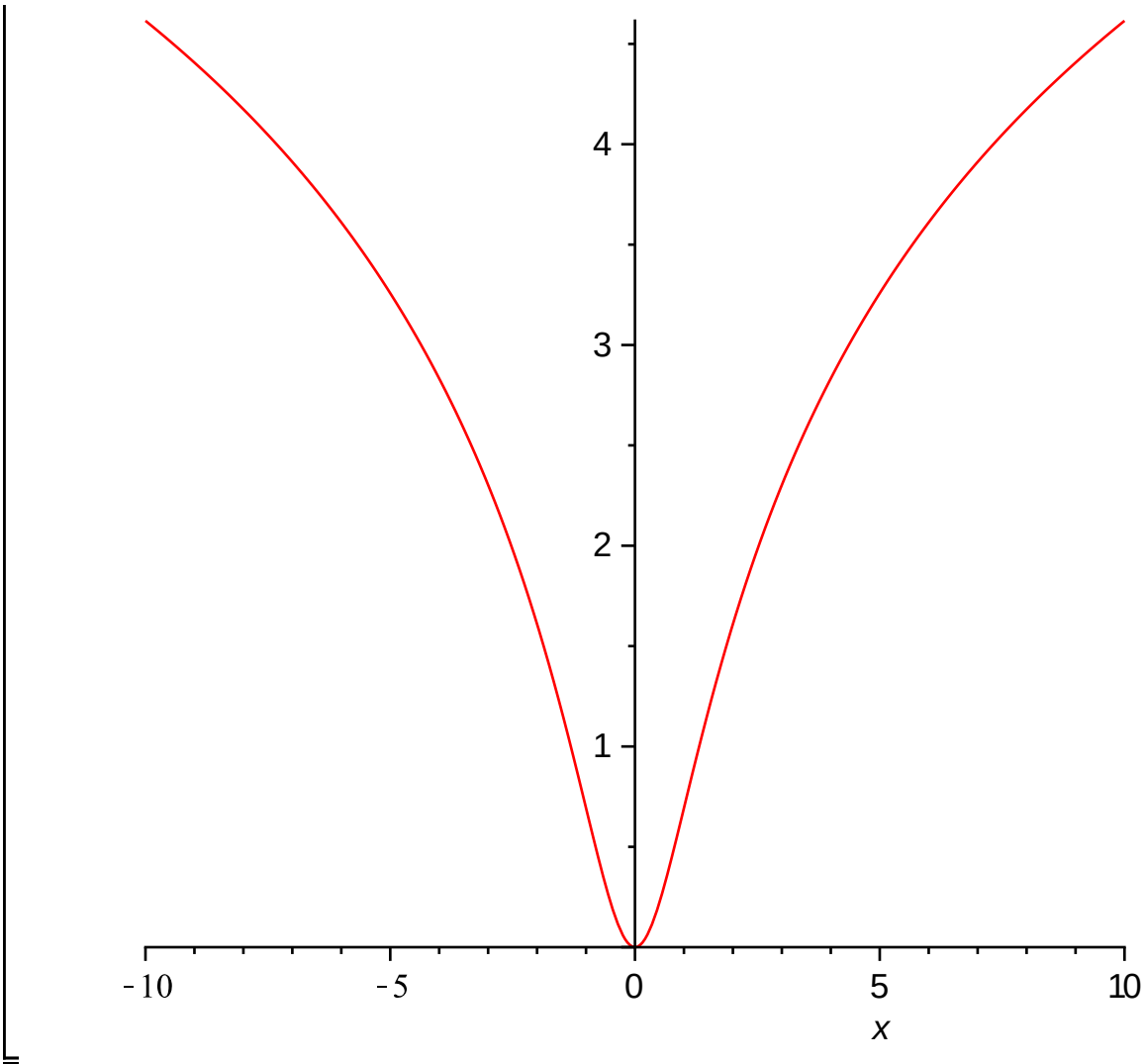
[4.74100921, 6.629799700], [-4.161209104, 12.97065701], [-9.244878967, 15.58880592], [3.73215737, 7.888272588], [-9.966969382, 15.84750500], [-8.751836722, 14.80480497], [-9.568251031, 15.58892855], [6.22812174, 4.808403058], [-1.795496706, 10.81573930], [1.90087358, 9.193253168], [-0.483809740, 10.20954010], [4.62224188, 7.480511874], [5.17254288, 5.751833858], [1.33864773, 8.362658071], [4.49864442, 6.349101244], [-3.945185484, 11.28261858], [7.53082987, 4.229521738], [3.54784565, 6.917151108], [-0.007054776, 9.729999636], [7.03834320, 5.016859239], [-7.914202782, 14.54119261], [2.50473190, 8.068621782], [-2.121873998, 10.98432108], [3.37859998, 7.831814257], [-9.566885949, 15.02955044], [2.05517497, 7.588419783], [4.95622739, 6.677813947], [-6.036594624, 13.45127081], [-3.073018440, 12.05459222], [9.30365148, 4.144406666], [0.11753379, 8.350491064], [-1.179301340, 10.20303836], [-4.068629672, 11.75336320], [-9.964646894, 15.12404073], [1.19156213, 8.422833607], [7.12928358, 5.558137021], [4.52889004, 6.319315304], [1.20194762, 8.587981108], [-9.760082609, 25.49495061], [-9.303682212, 23.10665064], [-5.958013710, 19.23827142], [-5.506327605, 16.24163082], [7.914762572, 0.175488813], [6.043252816, 0.602078588], [9.546060889, -5.425573476], [9, 203.9391800]]




```
> plot(1-exp(-x^2), x=-5..5);
```




```
> plot( log(1+x^2), x=-10..10);
```




```
> log(1+100^2);
```

$$\ln(10001) \tag{2}$$

```
> evalf(%);
```

$$9.210440367 \tag{3}$$

```
> epsilon:= (m,b,pt) -> ( m*pt[1]+b - pt[2]);
```

$$\varepsilon := (m, b, pt) \rightarrow m\,pt_1 + b - pt_2 \tag{4}$$

```
> H:= (m,b, data)-> sum(epsilon(m,b,data[i])^2
                , i=1..nops(data));
```

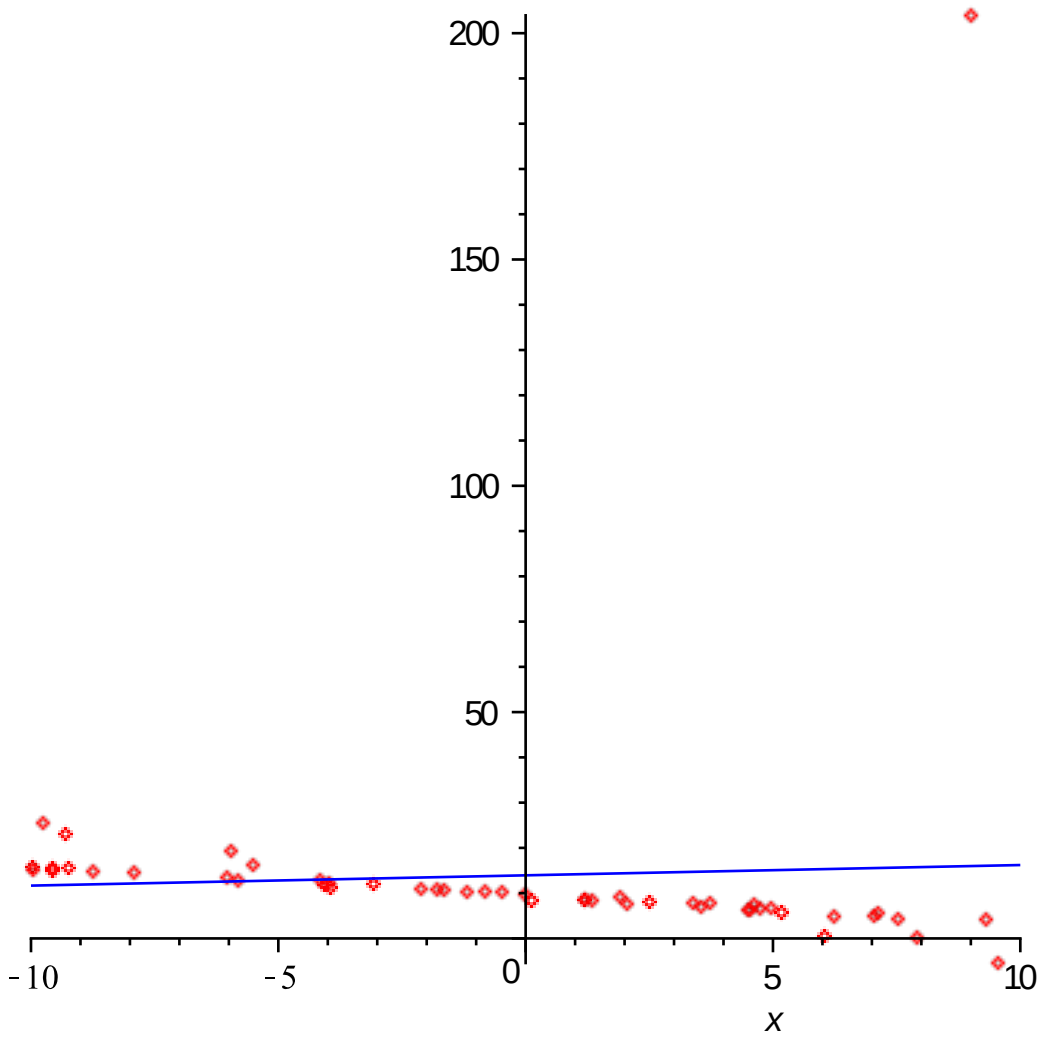
$$H := (m, b, data) \rightarrow \sum_{i=1}^{nops(data)} \varepsilon\left(m, b, data_i\right)^2 \tag{5}$$

```
> K:=(m,b, data)->sum(ln(1+epsilon(m,b,data[i])^2)
                , i=1..nops(data));
```

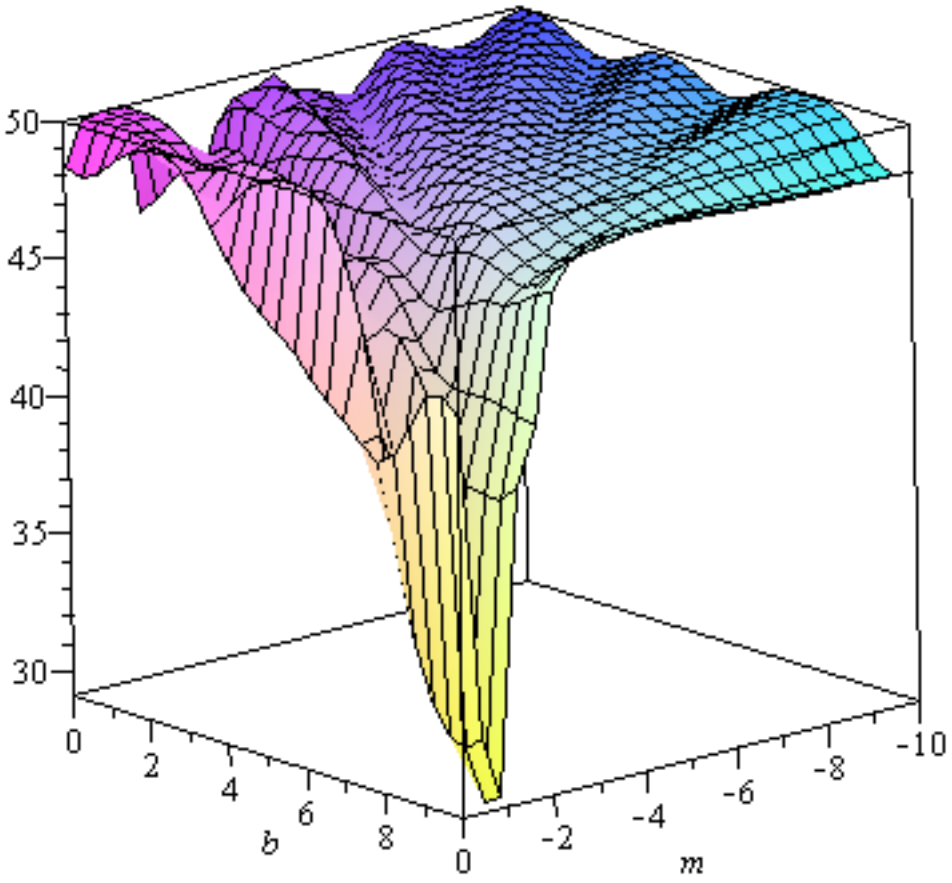
$$K := (m, b, data) \rightarrow \sum_{i=1}^{nops(data)} \ln\left(1 + \varepsilon\left(m, b, data_i\right)^2\right) \tag{6}$$

```
> mtaylor(ln(1+x^2),x);
```

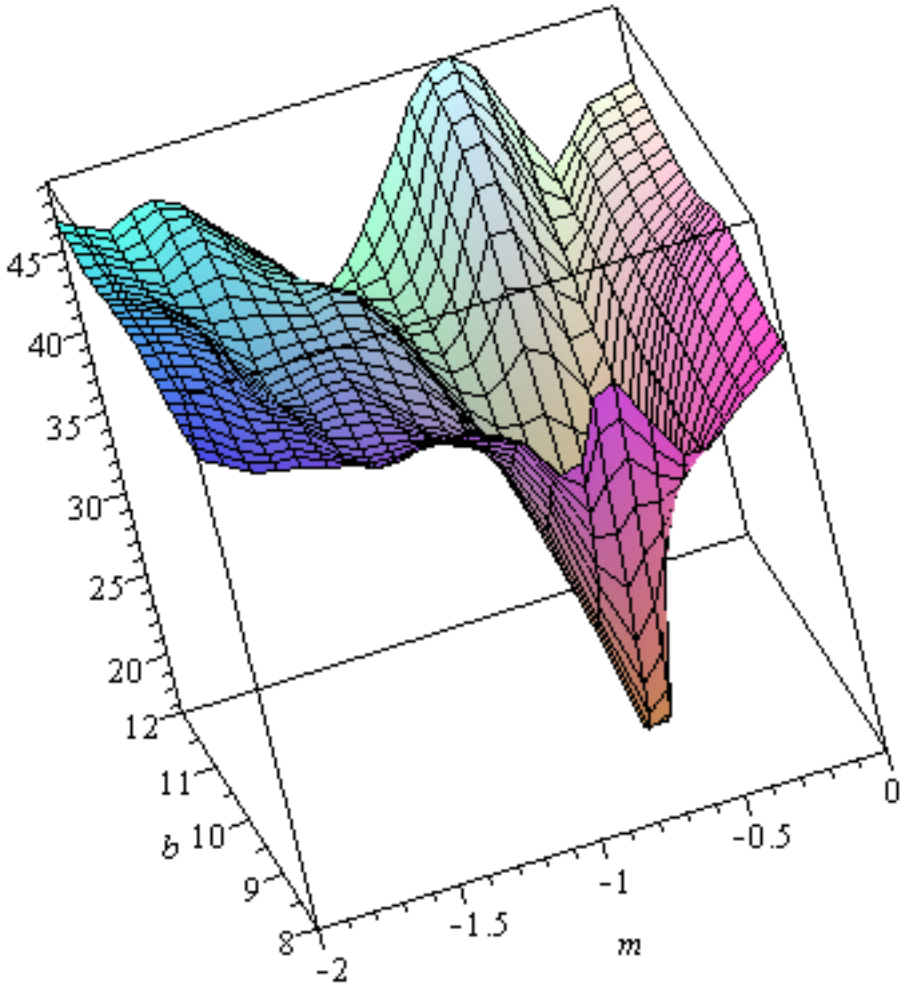
$$x^2 - \frac{1}{2}x^4 \tag{7}$$

```
> solve( { diff(K(m,b,data),m)=0,
  diff(K(m,b,data),b)=0});
```
Warning, computation interrupted
```
> J:=(m,b, data)->sum(1-exp(-epsilon(m,b,data[i])^2)
                , i=1..nops(data));
```
$$J := (m, b, data) \rightarrow \sum_{i=1}^{nops(data)} \left(1 - e^{-\varepsilon\left(m, b, data_i\right)^2}\right) \quad (8)$$
```
> solve( { diff(J(m,b,data),m)=0,
  diff(J(m,b,data),b)=0});
```
Warning, solutions may have been lost
```
> plot([data, LeastSquares(data,x)],x=-10..10,style=[point,line],
  color=[red,blue]);
```


```
> plot3d( J(m,b,data), m=-10..0, b=0..10, axes=boxed);
```




```
> plot3d( J(m,b,data), m=-2..0, b=8..12, axes=boxed);
```




```
> fsolve( { diff(J(m,b,data),m)=0,
  diff(J(m,b,data),b)=0}, {m=-2, b=8});
```

$$\{b = 2.964483834,\ m = -2.292699416\} \quad (9)$$

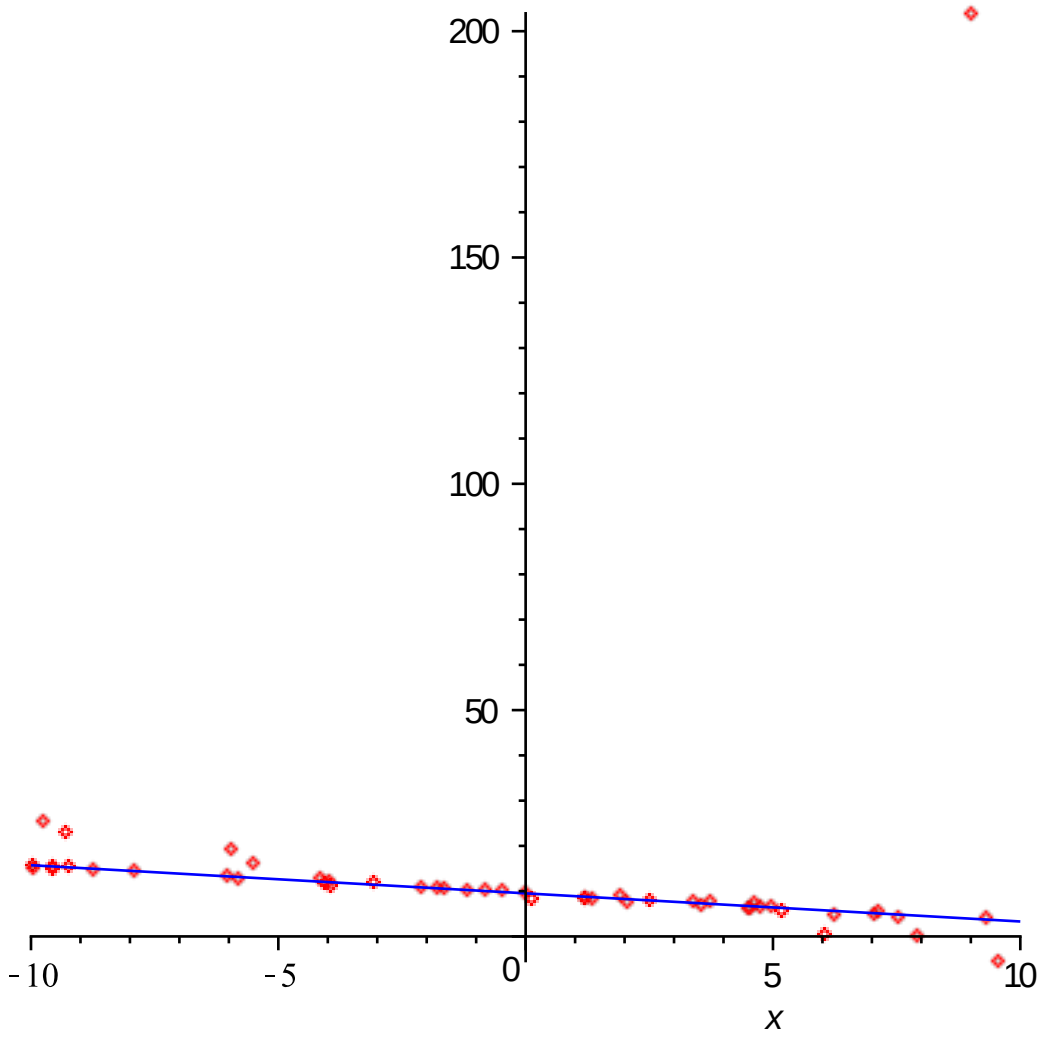
```
> Jsol:=fsolve( { diff(J(m,b,data),m)=0,
  diff(J(m,b,data),b)=0}, {m=-1..0, b=9..10});
```

$$Jsol := \{b = 9.515628333,\ m = -0.6220230863\} \quad (10)$$

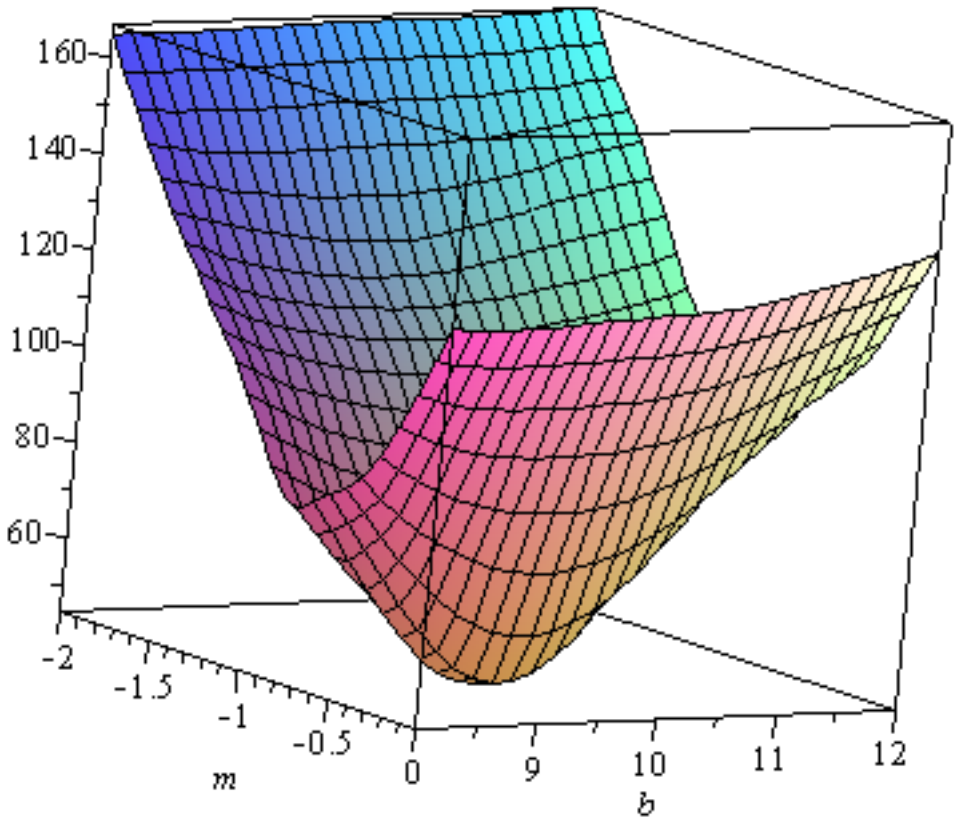
```
> Jline:=subs(Jsol, m*x+b);
```

$$Jline := -0.6220230863\,x + 9.515628333 \quad (11)$$

```
> plot([data, Jline],x=-10..10,style=[point,line], color=[red,blue]
  ) ;
```




```
> plot3d( K(m,b,data), m=-2..0, b=8..12, axes=boxed);
```




```
> Ksol:=fsolve( { diff(K(m,b,data),m)=0,
  diff(K(m,b,data),b)=0}, {m=-1..0, b=9..10});
```

$$Ksol := \{b = 9.508357224,\ m = -0.6328367475\} \quad (12)$$

```
> ?minimize
> Optimization[Minimize](K(m,b,data));
```

$$[43.6010402344630066,\ [b = 9.50835722229077,\ m = -0.632836747332637]] \quad (13)$$