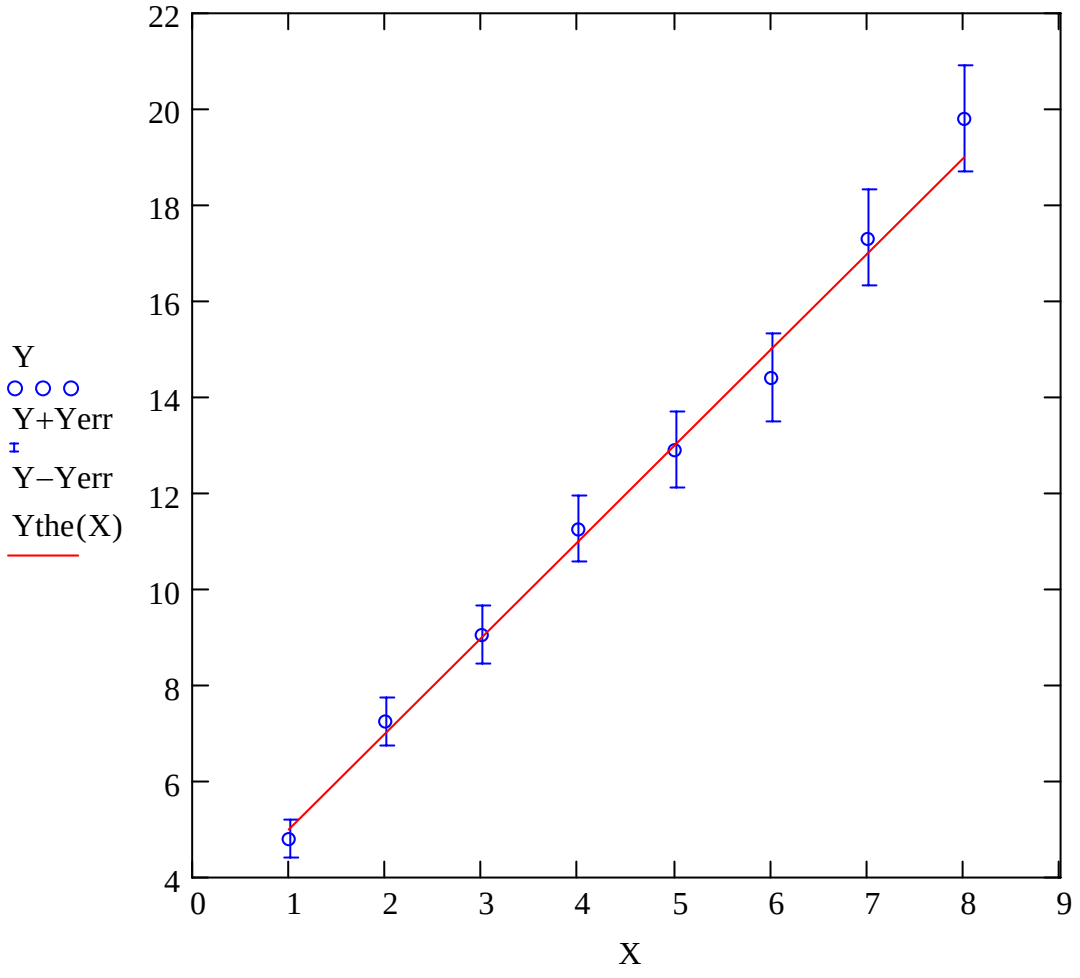
Data Plots

$Ythe(X) := 3 + 2X$

$$X := \begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \end{pmatrix} \qquad Y := \begin{pmatrix} 4.80 \\ 7.25 \\ 9.05 \\ 11.25 \\ 12.90 \\ 14.40 \\ 17.30 \\ 19.80 \end{pmatrix} \qquad Yerr := \begin{pmatrix} 0.40 \\ 0.50 \\ 0.60 \\ 0.70 \\ 0.80 \\ 0.90 \\ 1.00 \\ 1.10 \end{pmatrix}$$

$NN := rows(X)$ $\qquad NN = 8$



Least Square Method

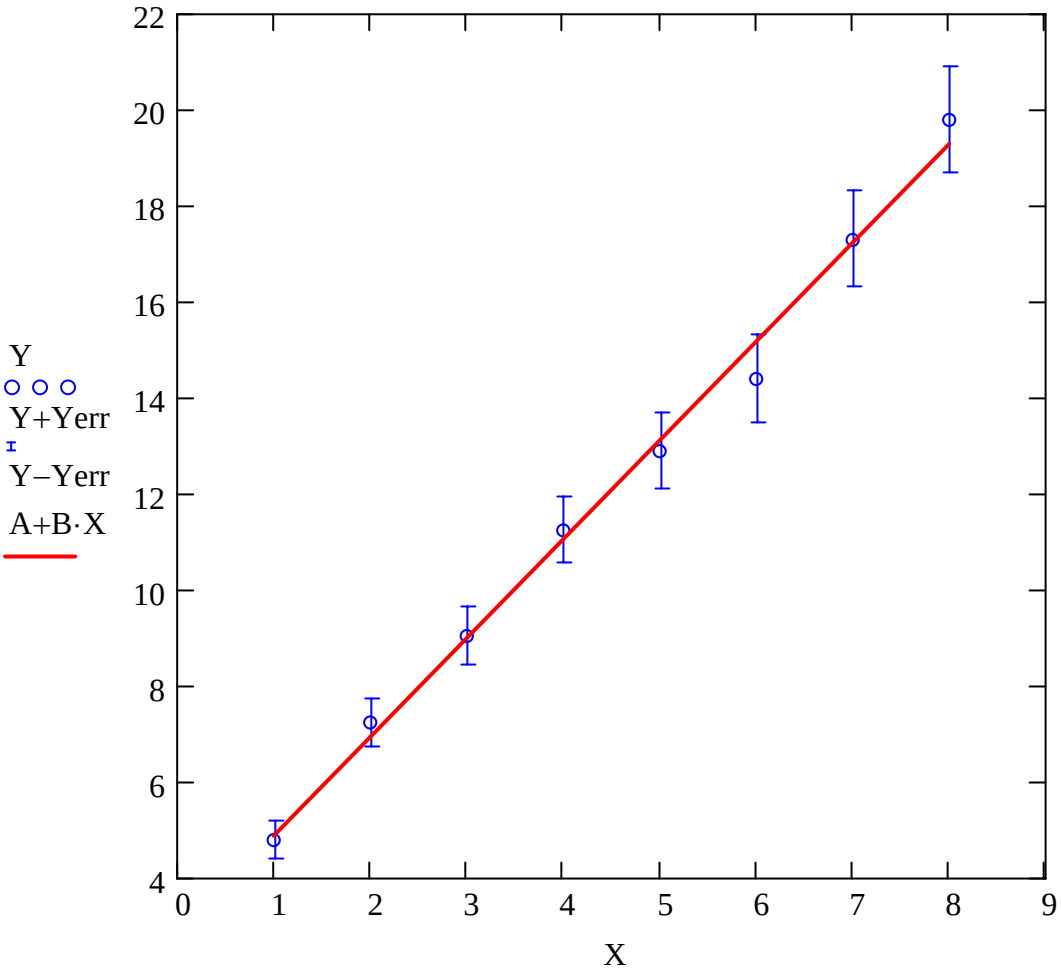
$$SX := \sum_{i=1}^{NN} X_i \qquad SY := \sum_{i=1}^{NN} Y_i \qquad SX2 := \sum_{i=1}^{NN} (X_i)^2 \qquad SXY := \sum_{i=1}^{NN} X_i \cdot Y_i$$

$SX = 36$ $SY = 96.75$ $SX2 = 204$ $SXY = 521.85$

$$D := NN \cdot SX2 - SX \cdot SX \qquad A := \frac{SX2 \cdot SY - SX \cdot SXY}{D} \qquad B := \frac{NN \cdot SXY - SX \cdot SY}{D}$$

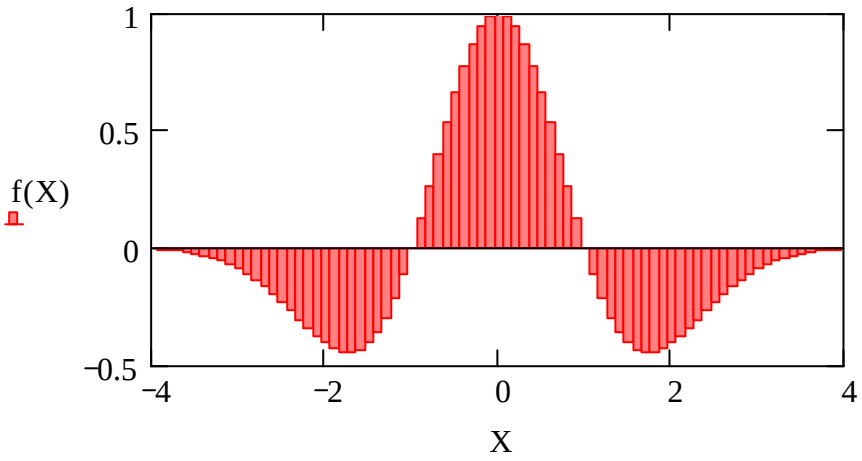
$A = 2.829$ $B = 2.059$

$\text{intercept}(X, Y) = 2.829$ $\text{slope}(X, Y) = 2.059$



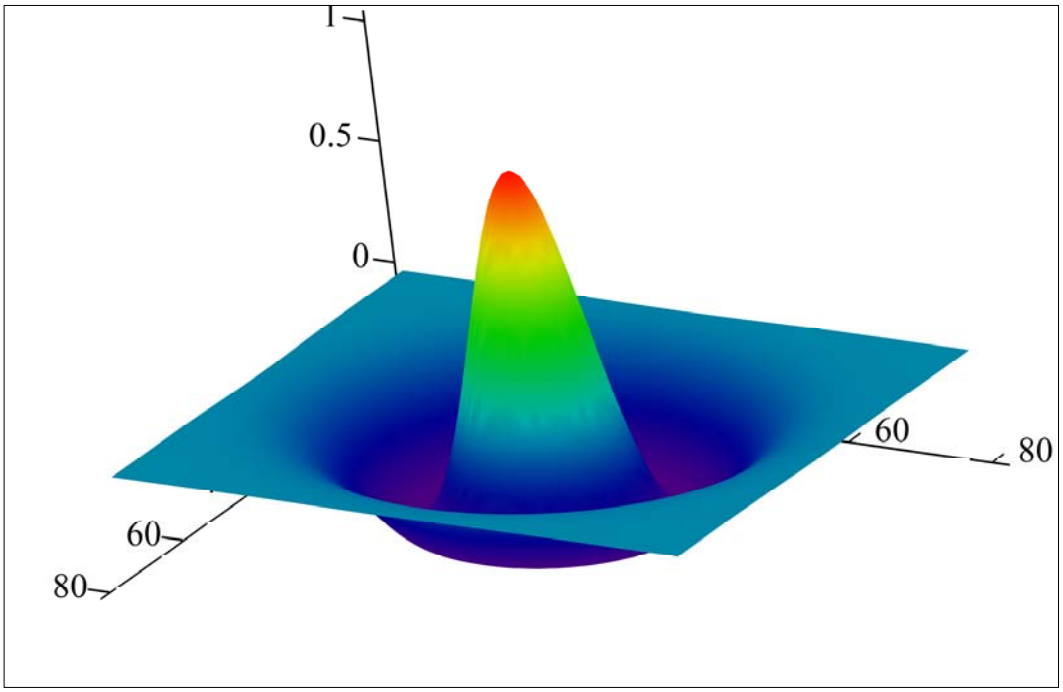
Surface and Contour Plots

$$f(x) := \left(1 - x^2\right)\cdot e^{\frac{-x^2}{2}} \qquad X := -4, -3.9 .. 4 \qquad Y := -4, -3.9 .. 4$$



$$H(x,y) := \left[1 - \left(x^2 + y^2\right)\right]\cdot e^{-\frac{x^2+y^2}{2}}$$

$$i := 1 .. 80 \qquad X_i := -4 + i\cdot 0.1 \qquad j := 1 .. 80 \qquad Y_i := -4 + i\cdot 0.1 \qquad M_{i,j} := H\left(X_i, Y_j\right)$$



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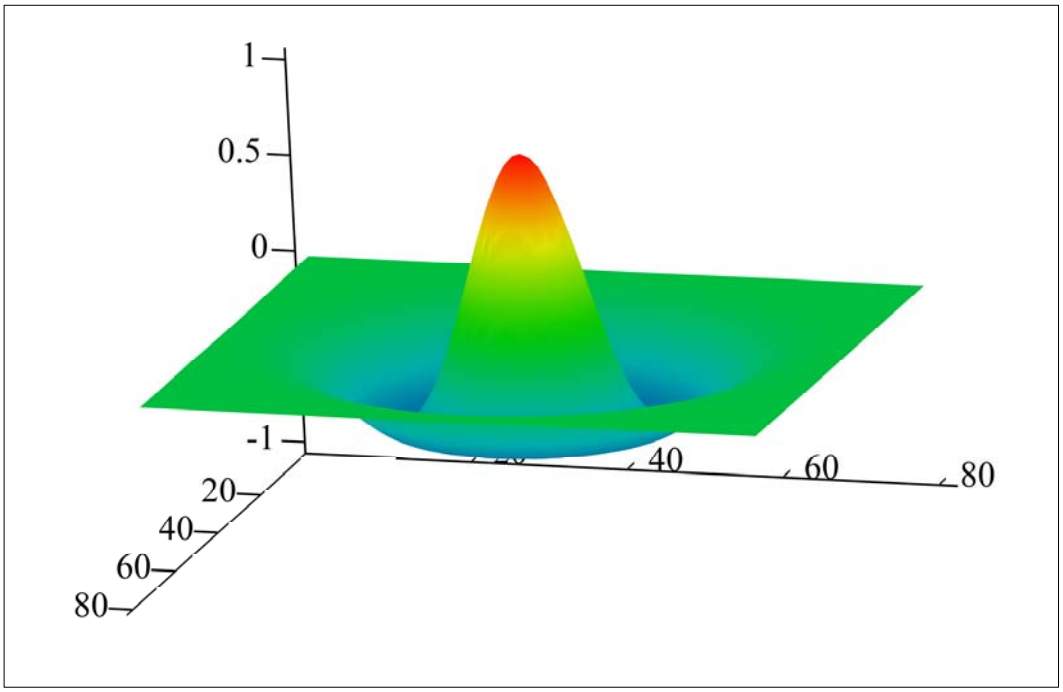
Animation

$k := 0.2$ $w := 0.1$ $t := FRAME$

$$H(x,y) := \left[1 - \left(x^2 + y^2\right)\right] \cdot e^{-\frac{x^2+y^2}{2}} \cdot \cos\left(k \cdot \sqrt{x^2 + y^2} - w \cdot t\right)$$

$i := 1 .. 80$ $X_i := -4 + i \cdot 0.1$ $j := 1 .. 80$ $Y_i := -4 + i \cdot 0.1$ $M_{i,j} := H(X_i, Y_j)$



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