$N := 20 \qquad \Delta x := 0.1$
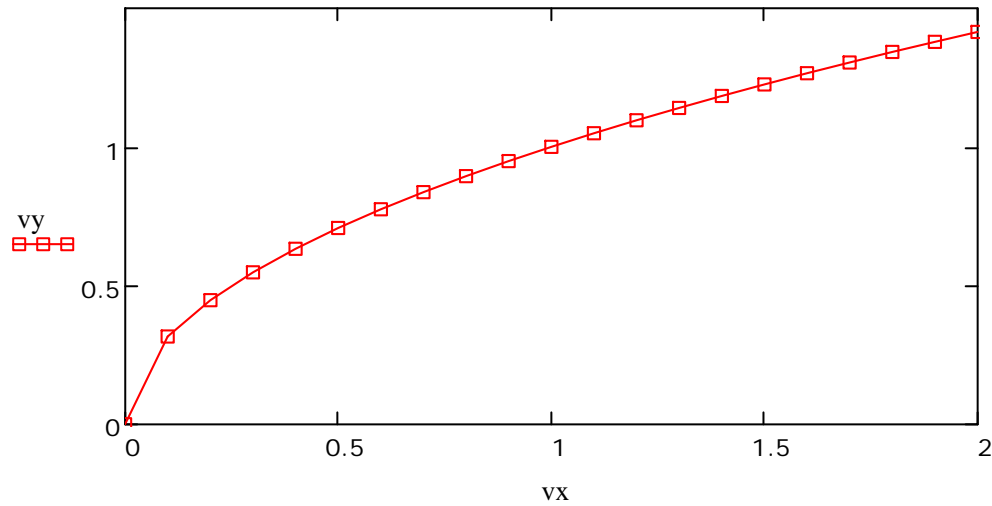
$i := 0 .. N$

$f(x) := \sqrt{x}$

$vx_i := i \cdot \Delta x$

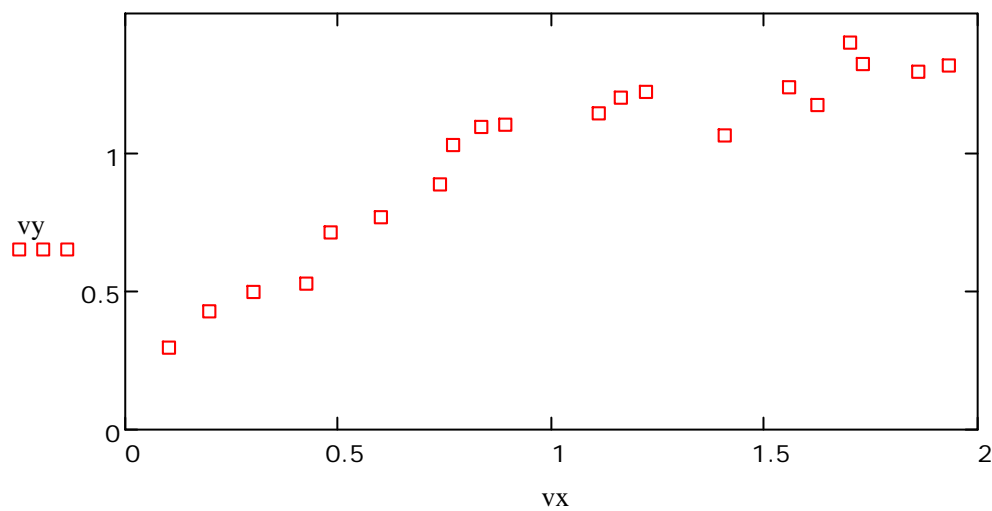$vy_i := f(vx_i)$

Generate random numbers in order to simulate measurement errors
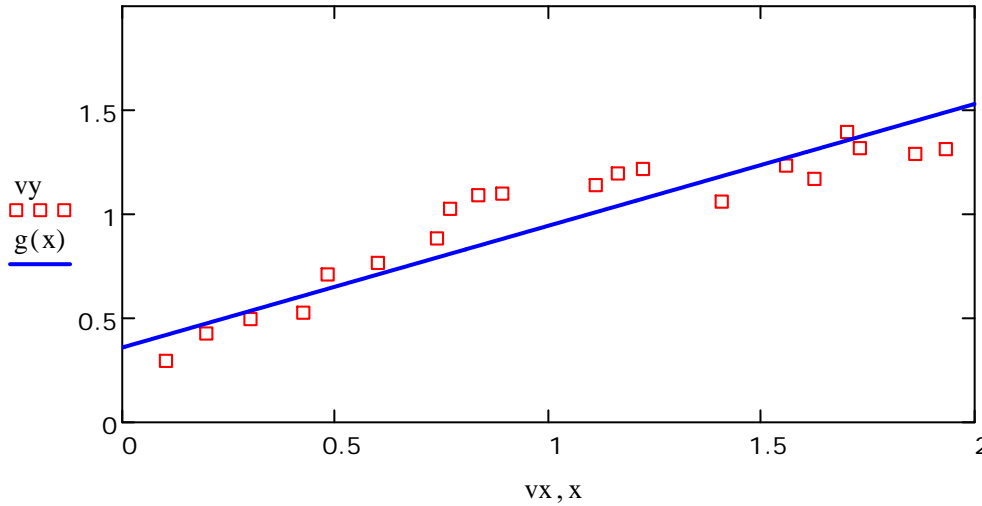
$\overrightarrow{vy := [vy \cdot (1 + rnorm(N + 1, 0, 0.1))]} \quad \overrightarrow{vx := [vx \cdot (1 + rnorm(N + 1, 0, 0.05))]}$

$vy_0 := rnorm(1, 0, 0.05)_0 \qquad\qquad vx_0 := \left| rnorm(1, 0, 0.025)_0 \right|$

Line Fit

$$\begin{pmatrix} a \\ b \end{pmatrix} := \text{line}(vx, vy) \qquad \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 0.359 \\ 0.585 \end{pmatrix} \qquad g(x) := a + b \cdot x$$
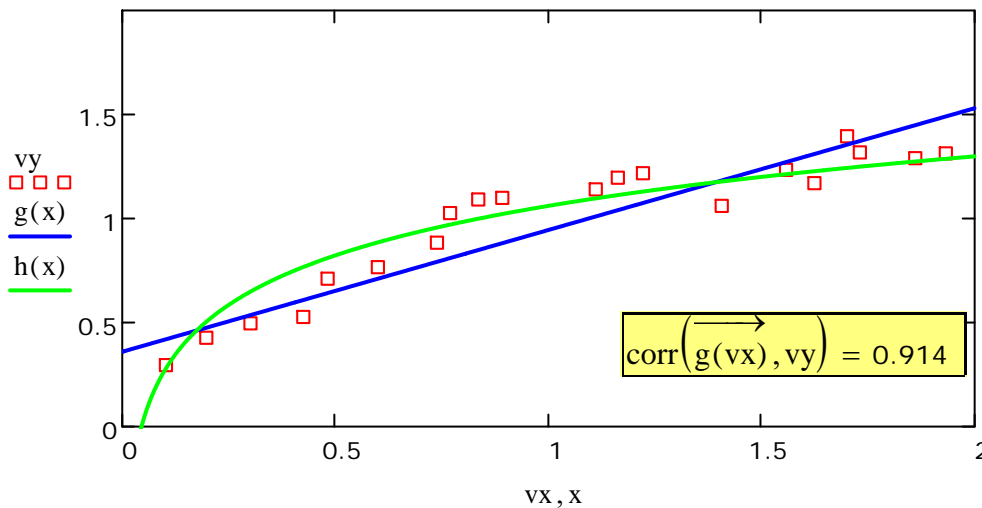

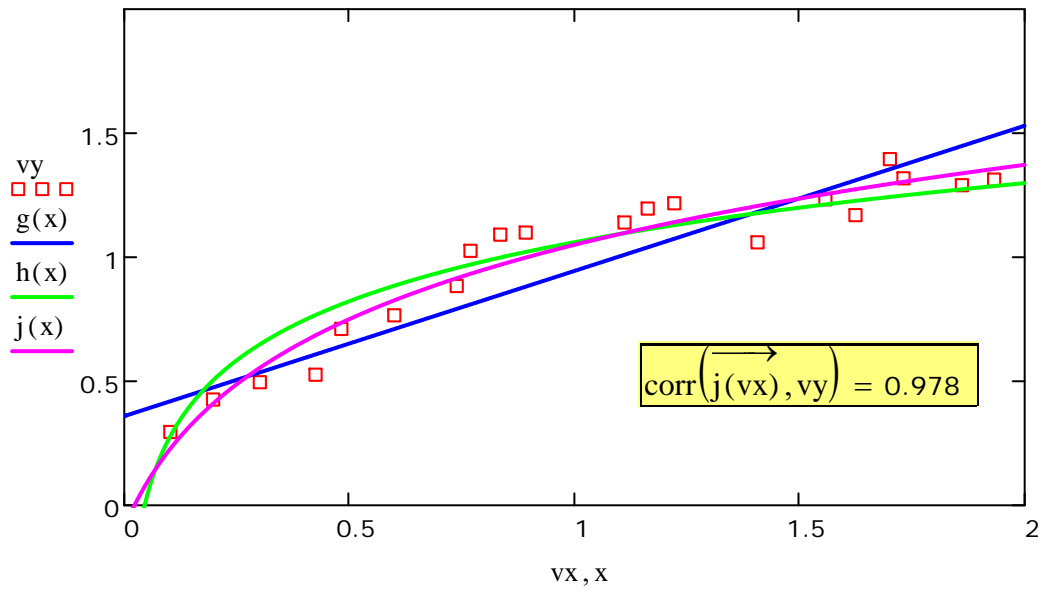$$\overrightarrow{\text{corr}\left(f(vx), vy\right)} = 0.967$$

Calculates the correlation between actual data and curve fitted data. For perfect fit it is 1.0.

Logarithmic Fit

$$\begin{pmatrix} a \\ b \end{pmatrix} := \text{lnfit}(vx, vy) \qquad \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 0.343 \\ 1.06 \end{pmatrix} \qquad h(x) := a \cdot \ln(x) + b$$

$$\overrightarrow{\text{corr}\left(g(vx), vy\right)} = 0.914$$

$$\begin{pmatrix} a \\ b \\ c \end{pmatrix} := \text{logfit}\left[vx, vy, \begin{pmatrix} 0.5 \\ 0.2 \\ 0.6 \end{pmatrix}\right] \qquad \begin{pmatrix} a \\ b \\ c \end{pmatrix} = \begin{pmatrix} 0.504 \\ 0.116 \\ 0.994 \end{pmatrix} \qquad j(x) := a \cdot \ln(x + b) + c$$

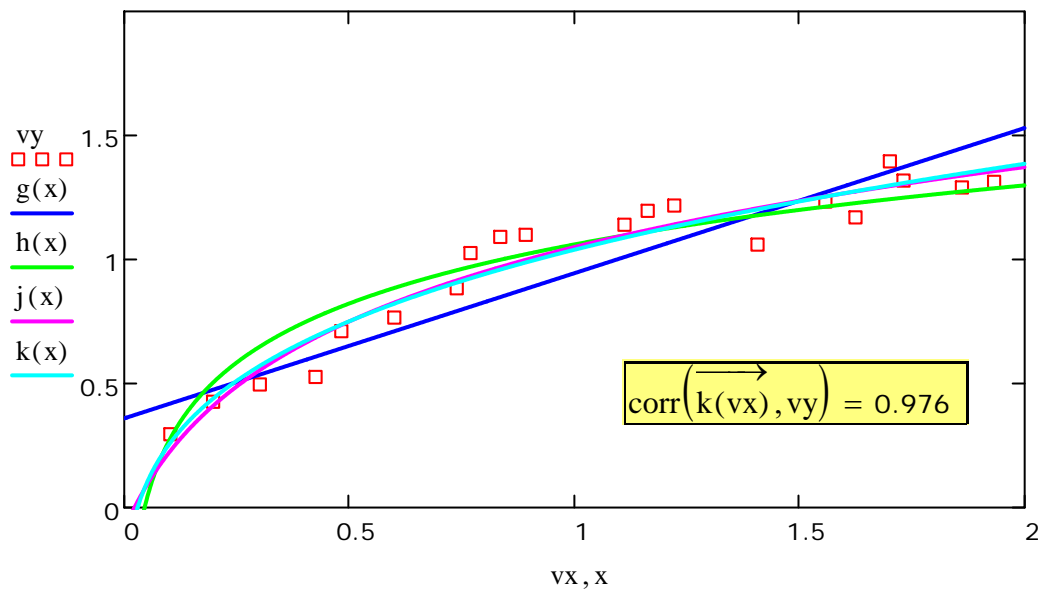$$\text{corr}\left(\overrightarrow{j(vx)}, vy\right) = 0.978$$

Power Fit

$$\begin{pmatrix} a \\ b \\ c \end{pmatrix} := \text{pwrfit}\left[vx, vy, \begin{pmatrix} 0.5 \\ 0.2 \\ 0.6 \end{pmatrix}\right] \qquad \begin{pmatrix} a \\ b \\ c \end{pmatrix} = \begin{pmatrix} 1.718 \\ 0.265 \\ -0.679 \end{pmatrix} \qquad k(x) := a \cdot x^b + c$$

$$\text{corr}\left(\overrightarrow{k(vx)}, vy\right) = 0.976$$

General Function Fit

$$F(x, a, b) := a \cdot \sqrt{x} + b \quad \text{Create a general function that you would like to fit the dat}$$

$$\begin{pmatrix} a \\ b \end{pmatrix} := \text{genfit}\left[vx, vy, \begin{pmatrix} 0.5 \\ 0.1 \end{pmatrix}, F\right] \qquad \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 1.053 \\ -0.044 \end{pmatrix} \qquad l(x) := a \cdot \sqrt{x} + b$$

$$\mathrm{corr}\left(\overrightarrow{l(vx)}, vy\right) = 0.967$$