

Curve Fitting Functions

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1. Origin Basic Functions

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Allometric1

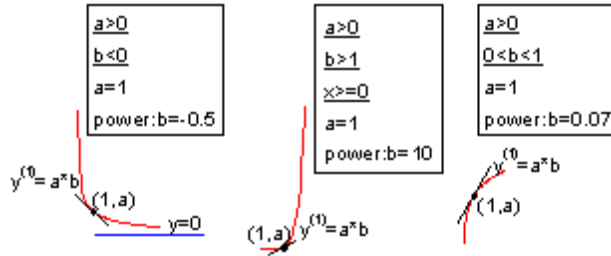
Function

$$y = ax^b$$

Brief Description

Classical Freundlich model. Has been used in the study of allometry.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = power

Initial Values: a = 1.0 (vary), b = 0.5 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

allometric1(x,a,b)

Function File

FITFUNC\ALLOMET1.FDF

Beta

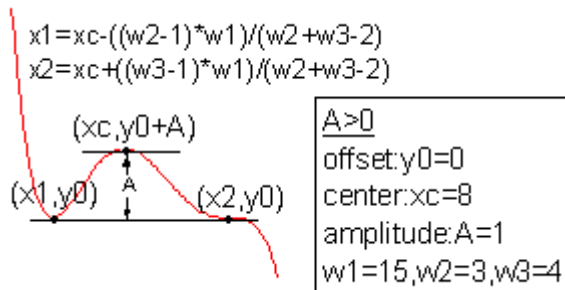
Function

$$y = y_0 + A \left[1 + \left(\frac{w_2 + w_3 - 2}{w_2 - 1} \right) \left(\frac{x - x_c}{w_1} \right) \right]^{w_2 - 1} \left[1 - \left(\frac{w_2 + w_3 - 2}{w_3 - 1} \right) \left(\frac{x - x_c}{w_1} \right) \right]^{w_3 - 1}$$

Brief Description

The beta function.

Sample Curve



Parameters

Number: 6

Names: $y_0, x_c, A, w_1, w_2, w_3$

Meanings: y_0 = offset, x_c = center, A = amplitude, w_1 = width, w_2 = width, w_3 = width

Initial Values: $y_0 = 0.0$ (vary), $x_c = 1.0$ (vary), $A = 5.0$ (vary), $w_1 = 5.0$ (vary), $w_2 = 2.0$ (vary), $w_3 = 2.0$ (vary)

Lower Bounds: $w_1 > 0.0, w_2 > 1.0, w_3 > 1.0$

Upper Bounds: none

Script Access

beta(x,y0,xc,A,w1,w2,w3)

Function File

FITFUNC\BETA.FDF

Boltzmann

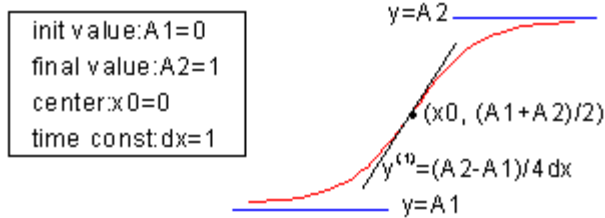
Function

$$y = \frac{A_1 - A_2}{1 + e^{(x-x_0)/dx}} + A_2$$

Brief Description

Boltzmann function - produces a sigmoidal curve.

Sample Curve



Parameters

Number: 4

Names: A1, A2, x0, dx

Meanings: A1 = initial value, A2 = final value, x0 = center, dx = time constant

Initial Values: A1 = 0.0 (vary), A2 = 1.0 (vary), x0 = 0.0 (vary), dx = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Constraints

dx != 0

Script Access

boltzman(x,A1,A2,x0,dx)

Function File

FITFUNC\BOLTZMAN.FDF

Dhyperbl

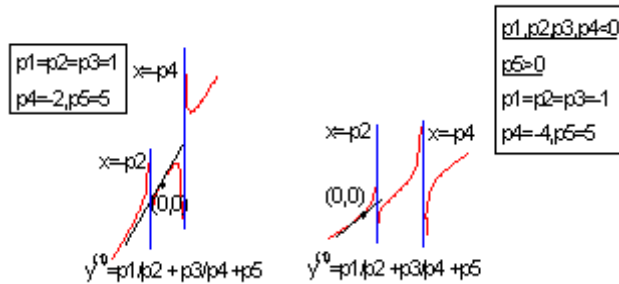
Function

$$y = \frac{P_1 x}{P_2 + x} + \frac{P_3 x}{P_4 + x} + P_5 x$$

Brief Description

Double rectangular hyperbola function.

Sample Curve



Parameters

Number: 5

Names: P1, P2, P3, P4, P5

Meanings: Unknowns 1-5

Initial Values: P1 = 1.0 (vary), P2 = 1.0 (vary), P3 = 1.0 (vary), P4 = 1.0 (vary), P5 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

dhyperbl(x,P1,P2,P3,P4,P5)

Function File

FITFUNC\DHYPERBL.FDF

ExpAssoc

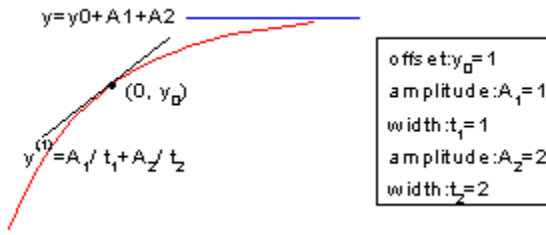
Function

$$y = y_0 + A_1(1 - e^{-x/t_1}) + A_2(1 - e^{-x/t_2})$$

Brief Description

Exponential associate.

Sample Curve



Parameters

Number: 5

Names: y_0 , A_1 , t_1 , A_2 , t_2

Meanings: y_0 = offset, A_1 = amplitude, t_1 = width, A_2 = amplitude, t_2 = width

Initial Values: $y_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary), $A_2 = 1.0$ (vary), $t_2 = 1.0$ (vary)

Lower Bounds: $t_1 > 0$, $t_2 > 0$

Upper Bounds: none

Script Access

expassoc(x,y0,A1,t1,A2,t2)

Function File

FITFUNC\EXPASSOC.FDF

ExpDecay1

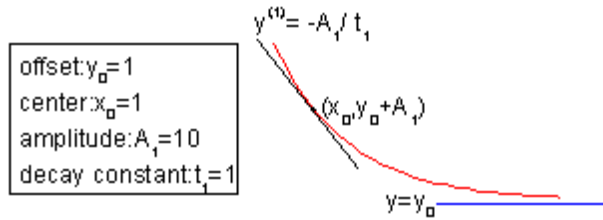
Function

$$y = y_0 + A_1 e^{-(x-x_0)/t_1}$$

Brief Description

Exponential decay 1 with offset.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_0 , A_1 , t_1

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = decay constant

Initial Values: $y_0 = 0.0$ (vary), $x_0 = 0.0$ (vary), $A_1 = 10$ (vary), $t_1 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expdecay1(x,y0,x0,A1,t1)

Function File

FITFUNC\EXPDECY1.FDF

ExpDecay2

Function

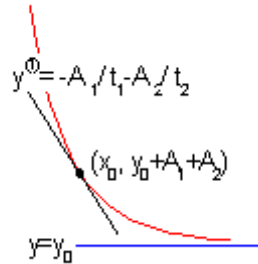
$$y = y_0 + A_1 e^{-(x-x_0)/t_1} + A_2 e^{-(x-x_0)/t_2}$$

Brief Description

Exponential decay 2 with offset.

Sample Curve

center: $x_0=0$
offset: $y_0=0$
amplitude: $A_1=1$
decay constant: $t_1=1$
amplitude: $A_2=2$
decay constant: $t_2=2$



Parameters

Number: 6

Names: y_0 , x_0 , A_1 , t_1 , A_2 , t_2

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = decay constant, A_2 = amplitude, t_2 = decay constant

Initial Values: $y_0 = 0.0$ (vary), $x_0 = 0.0$ (vary), $A_1 = 10$ (vary), $t_1 = 1.0$ (vary), $A_2 = 10$ (vary), $t_2 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expdecay2(x,y0,x0,A1,t1,A2,t2)

Function File

FITFUNC\EXPDECY2.FDF

ExpDecay3

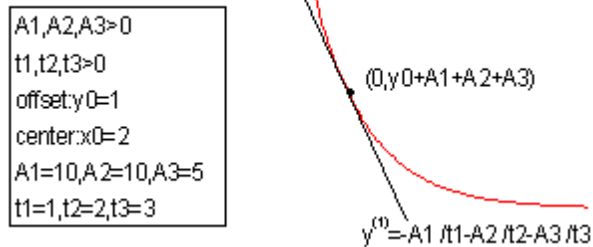
Function

$$y = y_0 + A_1 e^{-(x-x_0)/t_1} + A_2 e^{-(x-x_0)/t_2} + A_3 e^{-(x-x_0)/t_3}$$

Brief Description

Exponential decay 3 with offset.

Sample Curve



Parameters

Number: 8

Names: y0, x0, A1, t1, A2, t2, A3, t3

Meanings: y0 = offset, x0 = center, A1 = amplitude, t1 = decay constant, A2 = amplitude, t2 = decay constant, A3 = amplitude, t3 = decay constant

Initial Values: y0 = 0.0 (vary), x0 = 0.0 (vary), A1 = 10 (vary), t1 = 1.0 (vary), A2 = 10 (vary), t2 = 1.0 (vary), A3 = 10 (vary), t3 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expdecay3(x,y0,x0,A1,t1,A2,t2,A3,t3)

Function File

FITFUNC\EXPDECY3.FDF

ExpGrow1

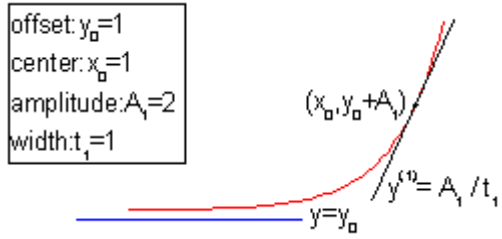
Function

$$y = y_0 + A_1 e^{(x-x_0)/t_1}$$

Brief Description

Exponential growth 1 with offset.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_0 , A_1 , t_1

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = width

Initial Values: $y_0 = 0.0$ (vary), $x_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary)

Lower Bounds: $t_1 > 0.0$

Upper Bounds: none

Script Access

expgrow1(x,y0,x0,A1,t1)

Function File

FITFUNC\EXPGROW1.FDF

ExpGrow2

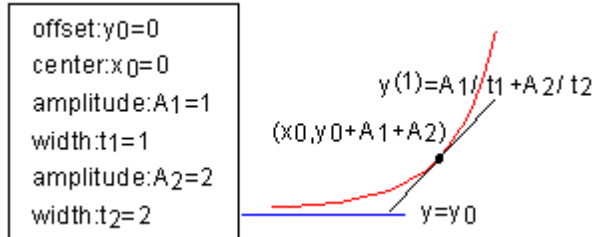
Function

$$y = y_0 + A_1 e^{(x-x_0)/t_1} + A_2 e^{(x-x_0)/t_2}$$

Brief Description

Exponential growth 2 with offset.

Sample Curve



Parameters

Number: 6

Names: y_0 , x_0 , A_1 , t_1 , A_2 , t_2

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = width, A_2 = amplitude, t_2 = width

Initial Values: $y_0 = 0.0$ (vary), $x_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary), $A_2 = 1.0$ (vary), $t_2 = 1.0$ (vary)

Lower Bounds: $t_1 > 0.0$, $t_2 > 0.0$

Upper Bounds: none

Script Access

expgrow2(x,y0,x0,A1,t1,A2,t2)

Function File

FITFUNC\EXPGROW2.FDF

Gauss

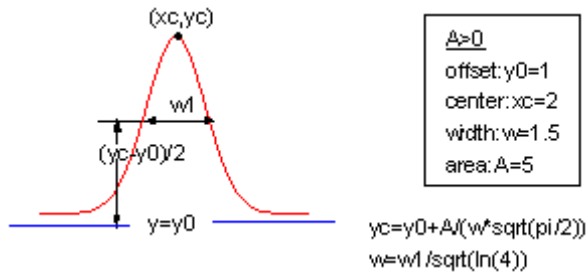
Function

$$y = y_0 + \frac{A}{w\sqrt{\pi/2}} e^{-2\frac{(x-x_c)^2}{w^2}}$$

Brief Description

Area version of Gaussian function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 10$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

gauss(x,y0,xc,w,A)

Function File

FITFUNC\GAUSS.FDF

GaussAmp

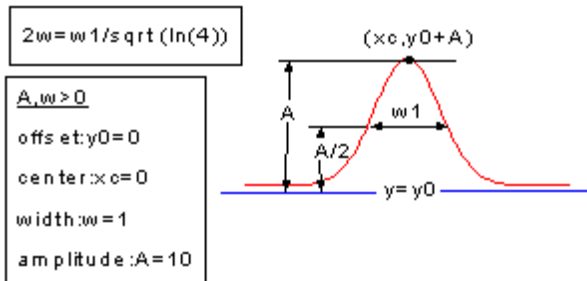
Function

$$y = y_0 + Ae^{-\frac{(x-x_c)^2}{2w^2}}$$

Brief Description

Amplitude version of Gaussian peak function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 10$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

gaussamp(x,y0,xc,w,A)

Function File

FITFUNC\GAUSSAMP.FDF

Hyperbl

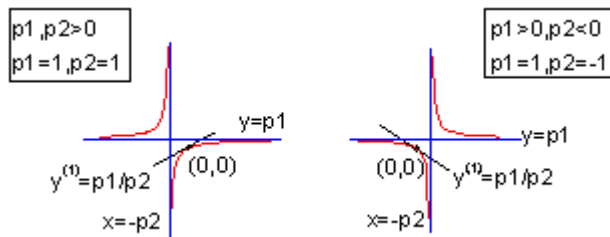
Function

$$y = \frac{P_1 x}{P_2 + x}$$

Brief Description

Hyperbola function. Also the Michaelis-Menten model in enzyme kinetics.

Sample Curve



Parameters

Number: 2

Names: P1, P2

Meanings: P1 = amplitude, P2 = unknown

Initial Values: P1 = 1.0 (vary), P2 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

hyperbl(x,P1,P2)

Function File

FITFUNC\HYPERBL.FDF

Logistic

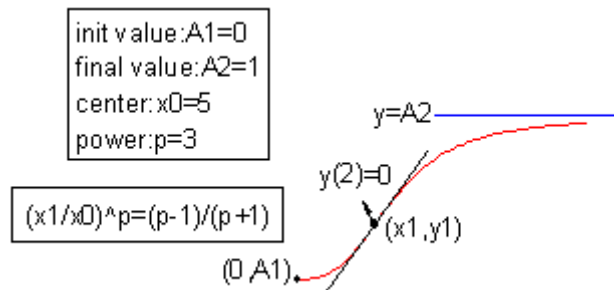
Function

$$y = \frac{A_1 - A_2}{1 + (x/x_0)^p} + A_2$$

Brief Description

Logistic dose response in pharmacology/chemistry.

Sample Curve



Parameters

Number: 4

Names: A1, A2, x0, p

Meanings: A1 = initial value, A2 = final value, x0 = center, p = power

Initial Values: A1 = 0.0 (vary), A2 = 1.0 (vary), x0 = 1.0 (vary), p = 1.5 (vary)

Lower Bounds: p > 0.0

Upper Bounds: none

Script Access

logistic(x,A1,A2,x0,p)

Function File

FITFUNC\LOGISTIC.FDF

LogNormal

Function

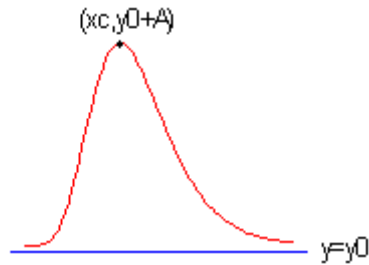
$$y = y_0 + \frac{A}{\sqrt{2\pi wx}} e^{-\frac{[\ln x/x_c]^2}{2w^2}}$$

Brief Description

Log-Normal function.

Sample Curve

$A, w > 0$
offset: $y_0 = 0$
center: $x_c = 150$
width: $w = 0.3$
amplitude: $A = 1$



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = amplitude

Initial Values: $y_0 = 0.0$ (vary), $x_c = 1.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $x_c > 0$, $w > 0$

Upper Bounds: none

Script Access

lognormal(x,y0,xc,w,A)

Function File

FITFUNC\LOGNORM.FDF

Lorentz

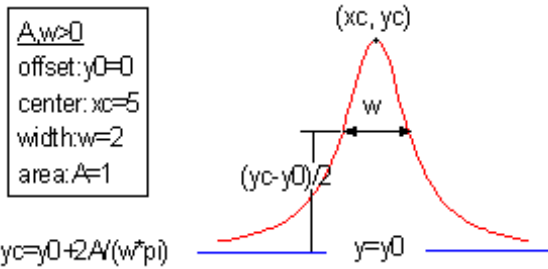
Function

$$y = y_0 + \frac{2A}{\pi} \frac{w}{4(x - x_c)^2 + w^2}$$

Brief Description

Lorentzian peak function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

lorentz(x,y0,xc,w,A)

Function File

FITFUNC\LORENTZ.FDF

Pulse

Function

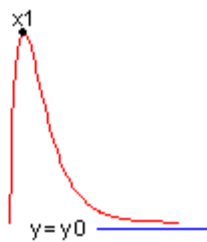
$$y = y_0 + A \left(1 - e^{-\frac{x-x_0}{t_1}} \right)^p e^{-\frac{x-x_0}{t_2}}$$

Brief Description

Pulse function.

Sample Curve

```
A,t1,t2>0
y0=0:offset
x0=0:center
A=1:amplitude
t1=0.5:width
p=1:power
t2=0.5:width
```



$$x1 = x0 + t1 * [\ln(p * t2 + t1) - \ln(t1)]$$

Parameters

Number: 6

Names: y0, x0, A, t1, P, t2

Meanings: y0 = offset, x0 = center, A = amplitude, t1 = width, P = power, t2 = width

Initial Values: y0 = 0.0 (vary), x0 = 0.0 (vary), A = 1.0 (vary), t1 = 1.0 (vary), P = 1.0 (vary), t2 = 1.0 (vary)

Lower Bounds: A > 0.0, t1 > 0.0, P > 0.0, t2 > 0.0

Upper Bounds: none

Script Access

pulse(x,y0,x0,A,t1,P,t2)

Function File

FITFUNC/PULSE.FDF

Rational0

Function

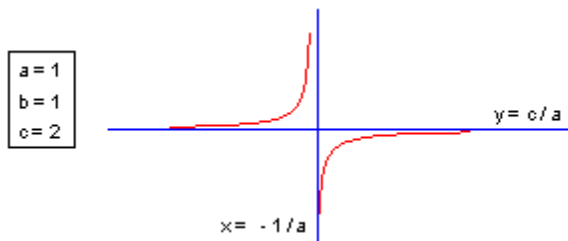
$$y = \frac{b + cx}{1 + ax}$$

Brief Description

Rational function, type 0.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.3.24

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

rational0(x,a,b,c)

Function File

FITFUNC\RATION0.FDF

Sine

Function

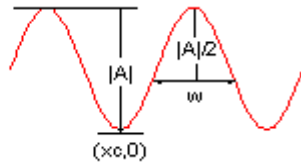
$$y = A \sin\left(\pi \frac{x - x_c}{w}\right)$$

Brief Description

Sine function.

Sample Curve

Center: $x_c=0$
Width: $w=1$
Amplitude: $A=1$



Parameters

Number: 3

Names: x_c , w , A

Meanings: x_c = center, w = width, A = amplitude

Initial Values: $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

sine(x,xc,w,A)

Function File

FITFUNC\SINE.FDF

Voigt

Function

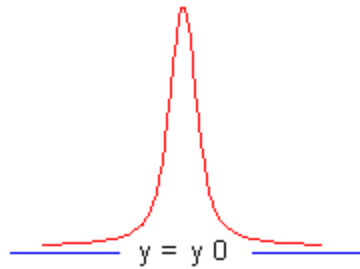
$$y = y_0 + A \cdot \frac{2 \ln 2}{\pi^{3/2}} \frac{w_L}{w_G^2} \cdot \int_{-\infty}^{\infty} \frac{e^{-t^2}}{\left(\sqrt{\ln 2} \frac{w_L}{w_G} \right)^2 + \left(\sqrt{4 \ln 2} \frac{x - x_c}{w_G} - t \right)^2} dt$$

Brief Description

Voigt peak function.

Sample Curve

$A > 0$
offset: $y_0 = 0$
center: $x_c = 5$
amplitude: $A = 1$
$w_G = 1, w_L = 1$



Parameters

Number: 5

Names: y_0 , x_c , A , w_G , w_L

Meanings: y_0 = offset, x_c = center, A = amplitude, w_G = Gaussian width, w_L = Lorentzian width

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $A = 1.0$ (vary), $w_G = 1.0$ (vary), $w_L = 1.0$ (vary)

Lower Bounds: $w_G > 0.0$, $w_L > 0.0$

Upper Bounds: none

Script Access

voigt5(x,y0,xc,A,wG,wL)

Function File

FITFUNC\VOIGT5.FDF

2. Chromatography Functions

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CCE

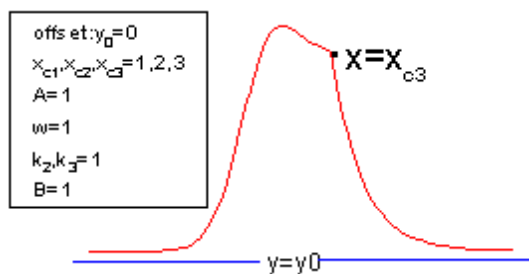
Function

$$y = y_0 + A \left[e^{-\frac{(x-x_{c1})^2}{2w}} + B(1 - 0.5(1 - \tanh(k_2(x - x_c)))) e^{-0.5k_3(|x-x_{c3}|+(x-x_{c3}))} \right]$$

Brief Description

Chesler-Cram peak function for use in chromatography.

Sample Curve



Parameters

Number: 9

Names: y_0 , x_{c1} , A , w , k_2 , x_{c2} , B , k_3 , x_{c3}

Meanings: y_0 = offset, x_{c1} = unknown, A = unknown, w = unknown, k_2 = unknown, x_{c2} = unknown, B = unknown, k_3 = unknown, x_{c3} = unknown

Initial Values: $y_0 = 0.0$ (vary), $x_{c1} = 1.0$ (vary), $A = 1.0$ (vary), $w = 1.0$ (vary), $k_2 = 1.0$ (vary), $x_{c2} = 1.0$ (vary), $B = 1.0$ (vary), $k_3 = 1.0$ (vary), $x_{c3} = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

cce(x,y0,xc1,A,w,k2,xc2,B,k3,xc3)

Function File

FITFUNC\CHESLECR.FDF

ECS

Function

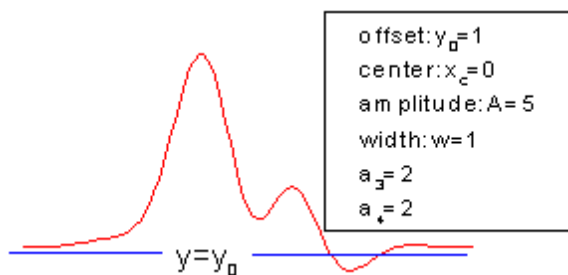
$$y = y_0 + \frac{A}{w\sqrt{2\pi}} \left\{ e^{-0.5z^2} \left(1 + \frac{a_3}{3!} z(z^2 - 3) + \frac{a_4}{4!} (z^4 - 6z^3 + 3) \right) + \frac{10a_3^2}{6!} (z^6 - 15z^4 + 45z^2 - 15) \right\}$$

where $z = \frac{x - x_c}{w}$

Brief Description

Edgeworth-Cramer peak function for use in chromatography.

Sample Curve



Parameters

Number: 6

Names: y_0 , x_c , A , w , a_3 , a_4

Meanings: y_0 = offset, x_c = center, A = amplitude, w = width, a_3 = unknown, a_4 = unknown

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $A = 1.0$ (vary), $w = 1.0$ (vary), $a_3 = 1.0$ (vary), $a_4 = 1.0$ (vary)

Lower Bounds: $A > 0.0$, $w > 0.0$

Upper Bounds: none

Script Access

ecs(x,y0,xc,A,w,a3,a4)

Function File

FITFUNC\EDGWTHCR.FDF

Gauss

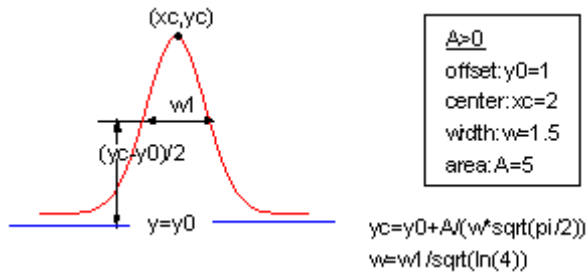
Function

$$y = y_0 + \frac{A}{w\sqrt{\pi/2}} e^{-2\frac{(x-x_c)^2}{w^2}}$$

Brief Description

Area version of Gaussian function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 10$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

gauss(x,y0,xc,w,A)

Function File

FITFUNC\GAUSS.FDF

GaussMod

Function

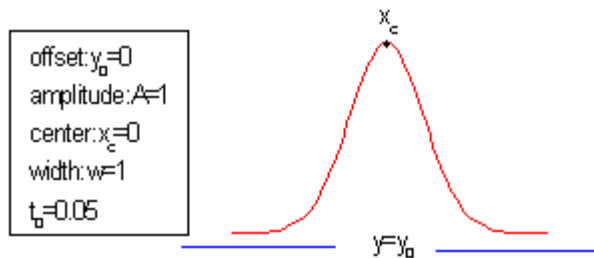
$$f(x) = y_0 + \frac{A}{t_0} e^{\frac{1}{2} \left(\frac{w}{t_0} \right)^2 \frac{x-x_c}{t_0}} \int_{-\infty}^z \frac{1}{\sqrt{2\pi}} e^{-\frac{y^2}{2}} dy$$

where $z = \frac{x - x_c}{w} - \frac{w}{t_0}$

Brief Description

Exponentially modified Gaussian peak function for use in chromatography.

Sample Curve



Parameters

Number: 5

Names: y_0 , A , x_c , w , t_0

Meanings: y_0 = offset, A = amplitude, x_c = center, w = width, t_0 = unknown

Initial Values: $y_0 = 0.0$ (vary), $A = 1.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $t_0 = 0.05$ (vary)

Lower Bounds: $w > 0.0$, $t_0 > 0.0$

Upper Bounds: none

Script Access

gaussmod(x,y0,A,xc,w,t0)

Function File

FITFUNC\GAUSSMOD.FDF

GCAS

Function

$$f(z) = y_0 + \frac{A}{w\sqrt{2\pi}} e^{-z^2/2} \left(1 + \sum_{i=3}^4 \frac{a_i}{i!} H_i(z) \right)$$

$$z = \frac{x - x_c}{w}$$

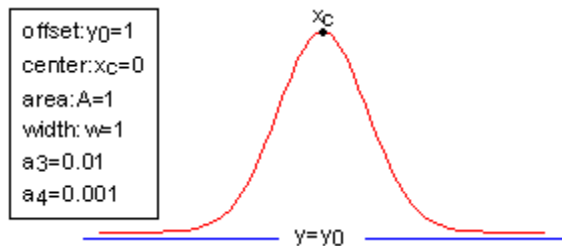
$$H_3 = z^3 - 3z$$

$$H_4 = z^4 - 6z^2 + 3$$

Brief Description

Gram-Charlier peak function for use in chromatography.

Sample Curve



Parameters

Number: 6

Names: y₀, x_c, A, w, a₃, a₄

Meanings: y₀ = offset, x_c = center, A = amplitude, w = width, a₃ = unknown, a₄ = unknown

Initial Values: y₀ = 0.0 (vary), x_c = 0.0 (vary), A = 1.0 (vary), w = 1.0 (vary), a₃ = 0.01 (vary), a₄ = 0.001 (vary)

Lower Bounds: w > 0.0

Upper Bounds: none

Script Access

gcas(x,y₀,x_c,A,w,a₃,a₄)

Function File

FITFUNC\GRMCHARL.FDF

Giddings

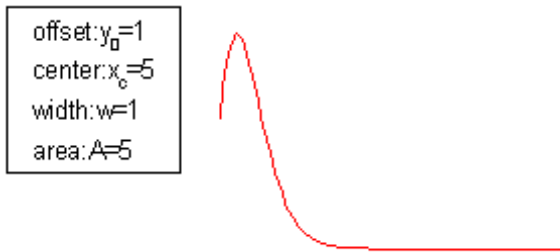
Function

$$y = y_0 + \frac{A}{w} \sqrt{\frac{x_c}{x}} I_1 \left(\frac{2\sqrt{x_c x}}{w} \right) e^{-\frac{x-x_c}{w}}$$

Brief Description

Giddings peak function for use in chromatography.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 1.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

`giddings(x,y0,xc,w,A)`

Function File

FITFUNC\GIDDINGS.FDF

3. Exponential Functions

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Asymptotic1

Function

$$y = a - bc^x$$

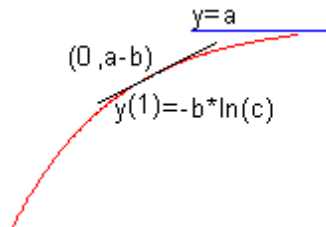
Brief Description

Asymptotic regression model - 1st parameterization.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.3.1

Sample Curve

asymptote : a=1
response
range : b=1
rate : c=0.5



Parameters

Number: 3

Names: a, b, c

Meanings: a = asymptote, b = response range, c = rate

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

Asymptotic1(x,a,b,c)

Function File

FITFUNC\ASYMPT1.FDF

BoxLucas1

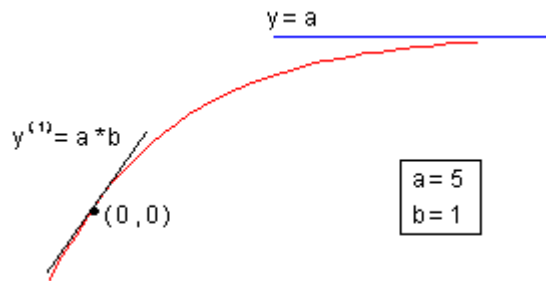
Function

$$y = a(1 - e^{-bx})$$

Brief Description

A parameterization of Box Lucas model.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

boxlucas1(x,a,b)

Function File

FITFUNC\BOXLUC1.FDF

BoxLucas1Mod

Function

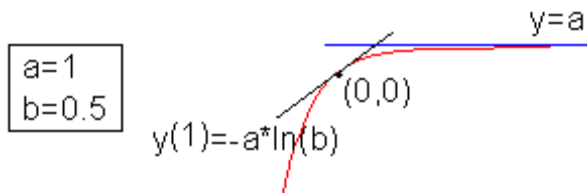
$$y = a(1 - b^x)$$

Brief Description

A parameterization of Box Lucas model.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.3.5

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

boxlucas1mod(x,a,b)

Function File

FITFUNC\BOXLC1MD.FDF

BoxLucas2

Function

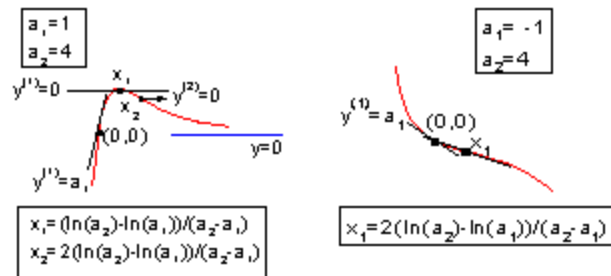
$$y = \frac{a_1}{a_1 - a_2} (e^{-a_2 x} - e^{-a_1 x})$$

Brief Description

A parameterization of Box Lucas model.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. p. 254

Sample Curve



Parameters

Number: 2

Names: a1, a2

Meanings: a1 = unknown, a2 = unknown

Initial Values: a1 = 2.0 (vary), a2 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

boxlucas2(x,a1,a2)

Function File

FITFUNC\BOXLUC2.FDF

Chapman

Function

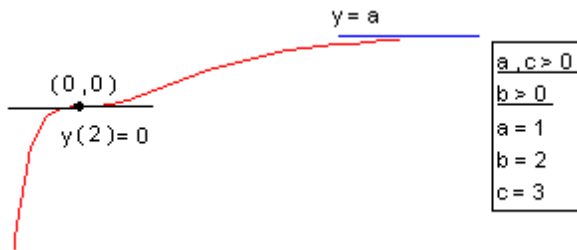
$$y = a(1 - e^{-bx})^c$$

Brief Description

Chapman model.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.3.35

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

chapman(x,a,b,c)

Function File

FITFUNC\CHAPMAN.FDF

Exp1P1

Function

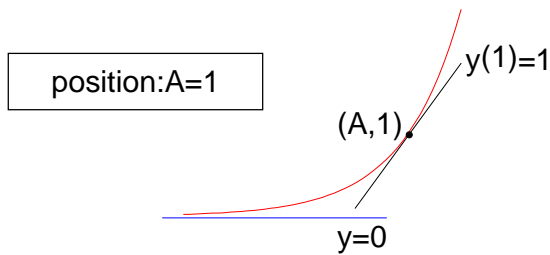
$$y = e^{x-A}$$

Brief Description

One-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.1.5

Sample Curve



Parameters

Number: 1

Names: A

Meanings: A = position

Initial Values: A = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp1p1(x,A)

Function File

FITFUNC\EXP1P1.FDF

Exp1p2

Function

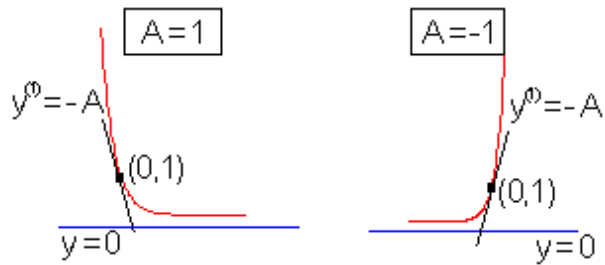
$$y = e^{-Ax}$$

Brief Description

One-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.1.15

Sample Curve



Parameters

Number: 1

Names: A

Meanings: A = coefficient

Initial Values: A = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp1p2(x,A)

Function File

FITFUNC\EXP1P2.FDF

Exp1p2md

Function

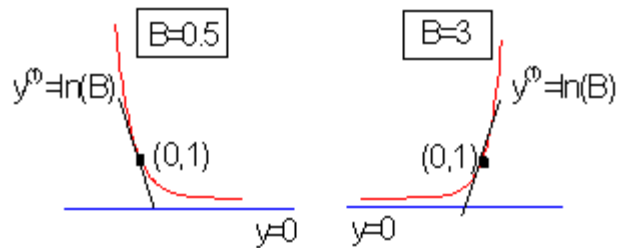
$$y = B^x$$

Brief Description

One-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.1.16

Sample Curve



Parameters

Number: 1

Names: B

Meanings: B = position

Initial Values: B = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp1p2md(x,B)

Function File

FITFUNC\EXP1P2MD.FDF

Exp1p3

Function

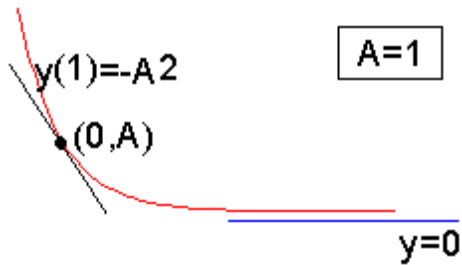
$$y = Ae^{-Ax}$$

Brief Description

One-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.1.13

Sample Curve



Parameters

Number: 1

Names: A

Meanings: A = coefficient

Initial Values: A = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp1p3(x,A)

Function File

FITFUNC\EXP1P3.FDF

Exp1P3Md

Function

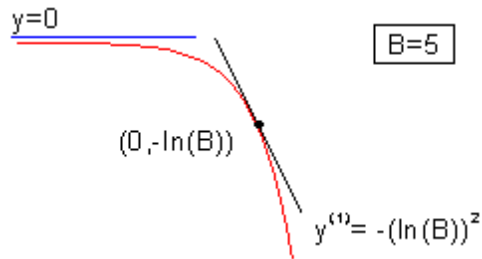
$$y = -\ln(B)B^x$$

Brief Description

One-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.1.14

Sample Curve



Parameters

Number: 1

Names: B

Meanings: B = coefficient

Initial Values: B = 5.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp1p3md(x,B)

Function File

FITFUNC\EXP1P3MD.DFD

Exp1P4

Function

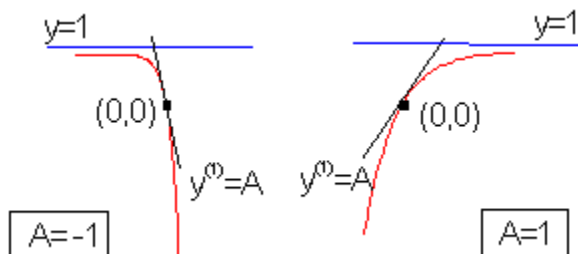
$$y = 1 - e^{-Ax}$$

Brief Description

One-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.1.18

Sample Curve



Parameters

Number: 1

Names: A

Meanings: A = coefficient

Initial Values: A = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp1p4(x,A)

Function File

FITFUNC\EXP1P4.FDF

Exp1P4Md

Function

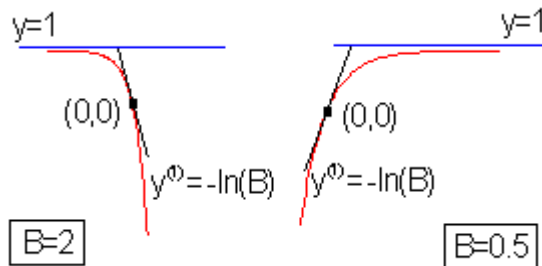
$$y = 1 - B^x$$

Brief Description

One-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.1.19

Sample Curve



Parameters

Number: 1

Names: B

Meanings: B = coefficient

Initial Values: B = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp1p4md(x,B)

Function File

FITFUNC\EXP1P4.FDF

Exp2P

Function

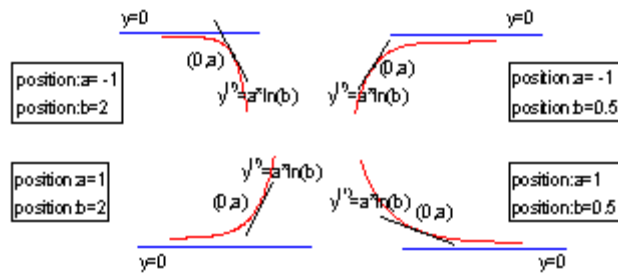
$$y = ab^x$$

Brief Description

Two-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.2.9

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = position, b = position

Initial Values: a = 1.0 (vary), b = 1.5 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp2p(x,a,b)

Function File

FITFUNC\EXP2P.FDF

Exp2PMod1

Function

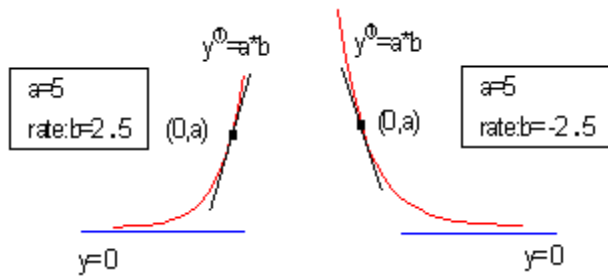
$$y = ae^{bx}$$

Brief Description

Two-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.2.10

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = rate

Initial Values: a = 1.0 (vary), b = 1.5 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp2pmod1(x,a,b)

Function File

FITFUNC\EXP2PMD1.FDF

Exp2PMod2

Function

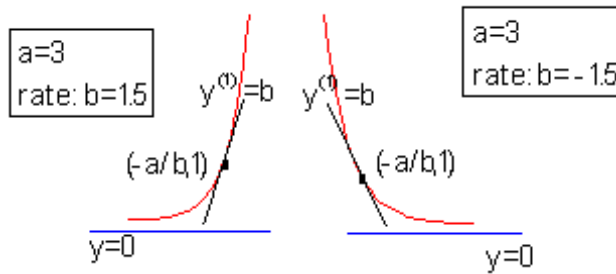
$$y = e^{a+bx}$$

Brief Description

Two-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.2.11

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = rate

Initial Values: a = 1.0 (vary), b = 1.5 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

exp2pmod2(x,a,b)

Function File

FITFUNC\EXP2PMD2.FDF

Exp3P1

Function

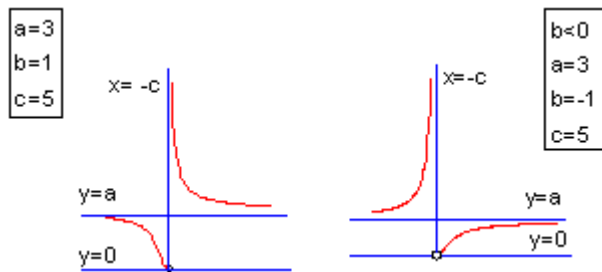
$$y = ae^{\frac{b}{x+c}}$$

Brief Description

Three-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.3.33

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

exp3p1(x,a,b,c)

Function File

FITFUNC\EXP3P1.FDF

Exp3P1Md

Function

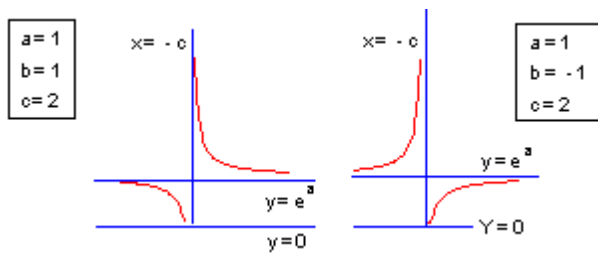
$$y = e^{a + \frac{b}{x+c}}$$

Brief Description

Three-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.3.34

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

exp3p1md(x,a,b,c)

Function File

FITFUNC\EXP3P1MD.FDF

Exp3P2

Function

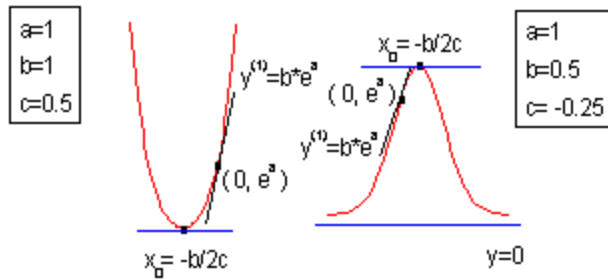
$$y = e^{a+bx+cx^2}$$

Brief Description

Three-parameter exponential function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.3.39

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

exp3p2(x,a,b,c)

Function File

FITFUNC\EXP3P2.FDF

ExpAssoc

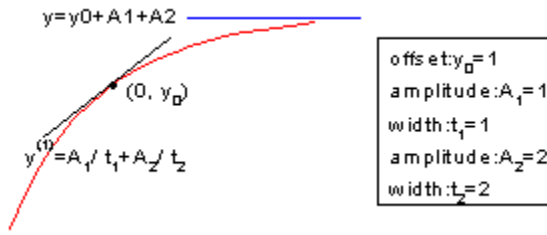
Function

$$y = y_0 + A_1(1 - e^{-x/t_1}) + A_2(1 - e^{-x/t_2})$$

Brief Description

Exponential associate.

Sample Curve



Parameters

Number: 5

Names: y_0 , A_1 , t_1 , A_2 , t_2

Meanings: y_0 = offset, A_1 = amplitude, t_1 = width, A_2 = amplitude, t_2 = width

Initial Values: $y_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary), $A_2 = 1.0$ (vary), $t_2 = 1.0$ (vary)

Lower Bounds: $t_1 > 0$, $t_2 > 0$

Upper Bounds: none

Script Access

expassoc(x,y0,A1,t1,A2,t2)

Function File

FITFUNC\EXPASSOC.FDF

ExpDec1

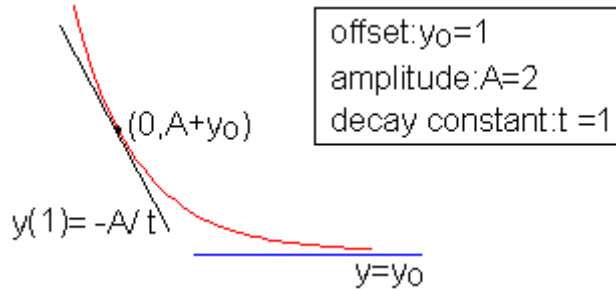
Function

$$y = y_0 + Ae^{-x/t}$$

Brief Description

Exponential decay 1.

Sample Curve



Parameters

Number: 3

Names: y_0 , A , t

Meanings: y_0 = offset, A = amplitude, t = decay constant

Initial Values: $y_0 = 0.0$ (vary), $A = 1.0$ (vary), $t = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expdec1(x,y0,A,t)

Function File

FITFUNC\EXPDEC1.FDF

ExpDec2

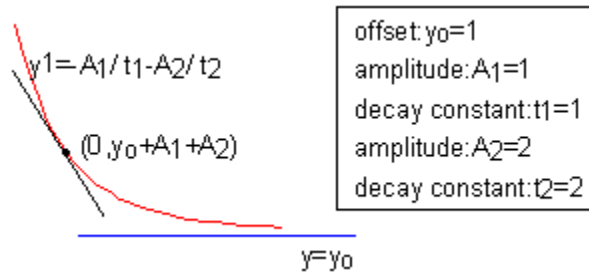
Function

$$y = y_0 + A_1 e^{-x/t_1} + A_2 e^{-x/t_2}$$

Brief Description

Exponential decay 2.

Sample Curve



Parameters

Number: 5

Names: y_0 , A_1 , t_1 , A_2 , t_2

Meanings: y_0 = offset, A_1 = amplitude, t_1 = decay constant, A_2 = amplitude, t_2 = decay constant

Initial Values: $y_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary), $A_2 = 1.0$ (vary), $t_2 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expdec2(x,y0,A1,t1,A2,t2)

Function File

FITFUNC\EXPDEC2.FDF

ExpDec3

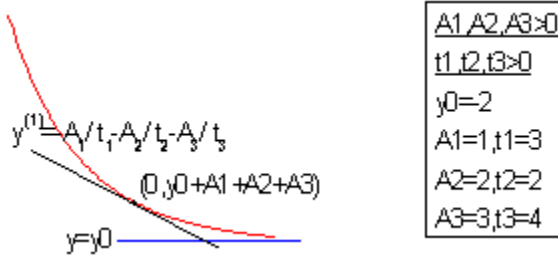
Function

$$y = y_0 + A_1 e^{-x/t_1} + A_2 e^{-x/t_2} + A_3 e^{-x/t_3}$$

Brief Description

Exponential decay 3.

Sample Curve



Parameters

Number: 7

Names: $y_0, A_1, t_1, A_2, t_2, A_3, t_3$

Meanings: y_0 = offset, A_1 = amplitude, t_1 = decay constant, A_2 = amplitude, t_2 = decay constant, A_3 = amplitude, t_3 = decay constant

Initial Values: $y_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary), $A_2 = 1.0$ (vary), $t_2 = 1.0$ (vary), $A_3 = 1.0$ (vary), $t_3 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expdec3(x,y0,A1,t1,A2,t2,A3,t3)

Function File

FITFUNC\EXPDEC3.FDF

ExpDecay1

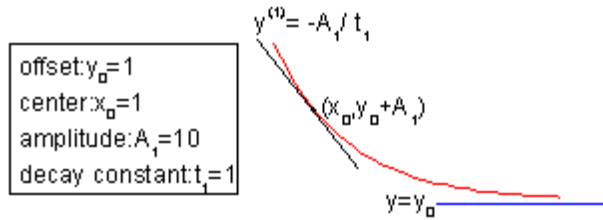
Function

$$y = y_0 + A_1 e^{-(x-x_0)/t_1}$$

Brief Description

Exponential decay 1 with offset.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_0 , A_1 , t_1

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = decay constant

Initial Values: $y_0 = 0.0$ (vary), $x_0 = 0.0$ (vary), $A_1 = 10$ (vary), $t_1 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expdecay1(x,y0,x0,A1,t1)

Function File

FITFUNC\EXPDECY1.FDF

ExpDecay2

Function

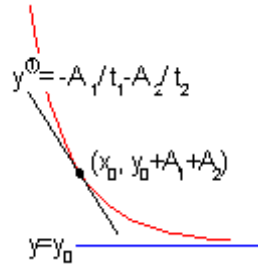
$$y = y_0 + A_1 e^{-(x-x_0)/t_1} + A_2 e^{-(x-x_0)/t_2}$$

Brief Description

Exponential decay 2 with offset.

Sample Curve

center: $x_0=0$
offset: $y_0=0$
amplitude: $A_1=1$
decay constant: $t_1=1$
amplitude: $A_2=2$
decay constant: $t_2=2$



Parameters

Number: 6

Names: y_0 , x_0 , A_1 , t_1 , A_2 , t_2

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = decay constant, A_2 = amplitude, t_2 = decay constant

Initial Values: $y_0 = 0.0$ (vary), $x_0 = 0.0$ (vary), $A_1 = 10$ (vary), $t_1 = 1.0$ (vary), $A_2 = 10$ (vary), $t_2 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expdecay2(x,y0,x0,A1,t1,A2,t2)

Function File

FITFUNC\EXPDECY2.FDF

ExpDecay3

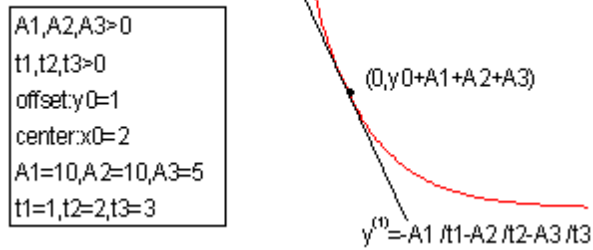
Function

$$y = y_0 + A_1 e^{-(x-x_0)/t_1} + A_2 e^{-(x-x_0)/t_2} + A_3 e^{-(x-x_0)/t_3}$$

Brief Description

Exponential decay 3 with offset.

Sample Curve



Parameters

Number: 8

Names: y_0 , x_0 , A_1 , t_1 , A_2 , t_2 , A_3 , t_3

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = decay constant, A_2 = amplitude, t_2 = decay constant, A_3 = amplitude, t_3 = decay constant

Initial Values: $y_0 = 0.0$ (vary), $x_0 = 0.0$ (vary), $A_1 = 10$ (vary), $t_1 = 1.0$ (vary), $A_2 = 10$ (vary), $t_2 = 1.0$ (vary), $A_3 = 10$ (vary), $t_3 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expdecay3(x,y0,x0,A1,t1,A2,t2,A3,t3)

Function File

FITFUNC\EXPDECY3.FDF

ExpGro1

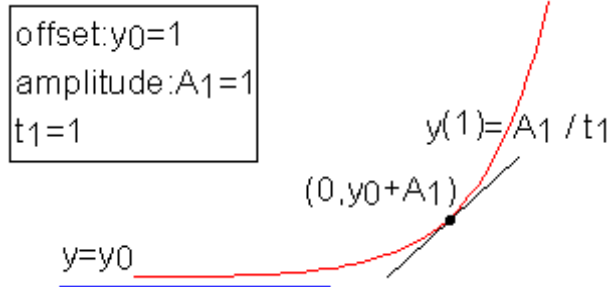
Function

$$y = y_0 + A_1 e^{x/t_1}$$

Brief Description

Exponential growth 1.

Sample Curve



Parameters

Number: 3

Names: y_0 , A_1 , t_1

Meanings: y_0 = offset, A_1 = amplitude, t_1 = growth constant

Initial Values: $y_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expgro1(x,y0,A1,t1)

Function File

FITFUNC\EXPGRO1.FDF

ExpGro2

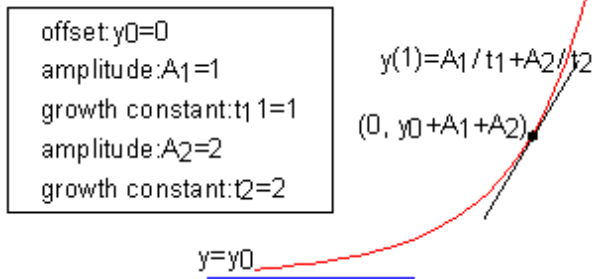
Function

$$y = y_0 + A_1 e^{x/t_1} + A_2 e^{x/t_2}$$

Brief Description

Exponential growth 2.

Sample Curve



Parameters

Number: 5

Names: y_0 , A_1 , t_1 , A_2 , t_2

Meanings: y_0 = offset, A_1 = amplitude, t_1 = growth constant, A_2 = amplitude, t_2 = growth constant

Initial Values: $y_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary), $A_2 = 1.0$ (vary), $t_2 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expgro2(x,y0,A1,t1,A2,t2)

Function File

FITFUNC\EXPGRO2.FDF

ExpGro3

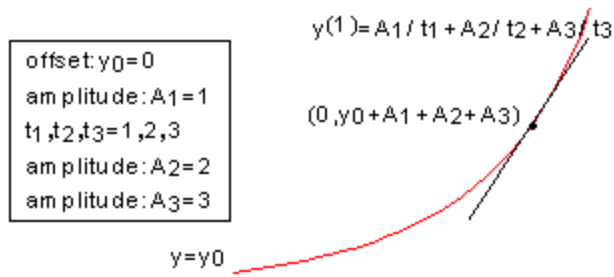
Function

$$y = y_0 + A_1 e^{x/t_1} + A_2 e^{x/t_2} + A_3 e^{x/t_3}$$

Brief Description

Exponential growth 3.

Sample Curve



Parameters

Number: 7

Names: $y_0, A_1, t_1, A_2, t_2, A_3, t_3$

Meanings: y_0 = offset, A_1 = amplitude, t_1 = growth constant, A_2 = amplitude, t_2 = growth constant, A_3 = amplitude, t_3 = growth constant

Initial Values: $y_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary), $A_2 = 1.0$ (vary), $t_2 = 1.0$ (vary), $A_3 = 1.0$ (vary), $t_3 = 1.0$ (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

expgro3(x,y0,A1,t1,A2,t2,A3,t3)

Function File

FITFUNC\EXPGRO3.FDF

ExpGrow1

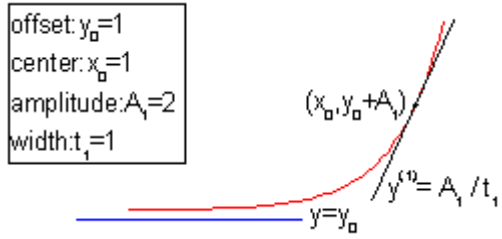
Function

$$y = y_0 + A_1 e^{(x-x_0)/t_1}$$

Brief Description

Exponential growth 1 with offset.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_0 , A_1 , t_1

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = width

Initial Values: $y_0 = 0.0$ (vary), $x_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary)

Lower Bounds: $t_1 > 0.0$

Upper Bounds: none

Script Access

expgrow1(x,y0,x0,A1,t1)

Function File

FITFUNC\EXPGROW1.FDF

ExpGrow2

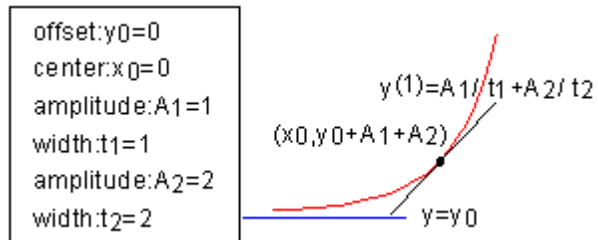
Function

$$y = y_0 + A_1 e^{(x-x_0)/t_1} + A_2 e^{(x-x_0)/t_2}$$

Brief Description

Exponential growth 2 with offset.

Sample Curve



Parameters

Number: 6

Names: $y_0, x_0, A_1, t_1, A_2, t_2$

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = width, A_2 = amplitude, t_2 = width

Initial Values: $y_0 = 0.0$ (vary), $x_0 = 0.0$ (vary), $A_1 = 1.0$ (vary), $t_1 = 1.0$ (vary), $A_2 = 1.0$ (vary), $t_2 = 1.0$ (vary)

Lower Bounds: $t_1 > 0.0, t_2 > 0.0$

Upper Bounds: none

Script Access

expgrow2(x,y0,x0,A1,t1,A2,t2)

Function File

FITFUNC\EXPGROW2.FDF

ExpLinear

Function

$$y = p_1 e^{-x/p_2} + p_3 + p_4 x$$

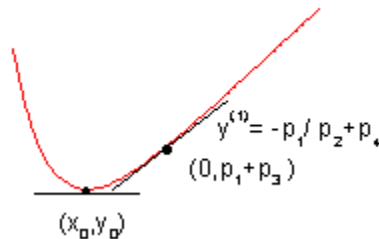
Brief Description

Exponential linear combination.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. p. 298

Sample Curve

```
x0 = -p2 ln(p2p4/p1)
y0 = p2p4 + p3
-p2p4 ln(p2p4/p1)
p1 = 1
p2 = 2
offset: p3 = 3
p4 = 4
```



Parameters

Number: 4

Names: p1, p2, p3, p4

Meanings: p1 = coefficient, p2 = unknown, p3 = offset, p4 = coefficient

Initial Values: p1 = 1.0 (vary), p2 = 1.0 (vary), p3 = 1.0 (vary), p4 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

explinear(x,p1,p2,p3,p4)

Function File

FITFUNC\EXPLINEA.FDF

Exponential

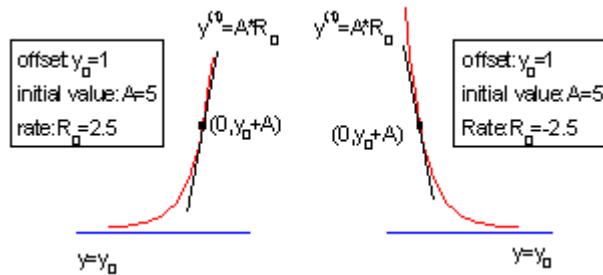
Function

$$y = y_0 + Ae^{R_0x}$$

Brief Description

Exponential.

Sample Curve



Parameters

Number: 3

Names: y_0 , A , R_0

Meanings: y_0 = offset, A = initial value, R_0 = rate

Initial Values: $y_0 = 0.0$ (vary), $A = 1.0$ (vary), $R_0 = 1.0$ (vary)

Lower Bounds: $A > 0.0$

Upper Bounds: none

Script Access

exponential(x, y_0, A, R_0)

Function File

FITFUNC\EXPONENT.FDF

MnMolecular

Function

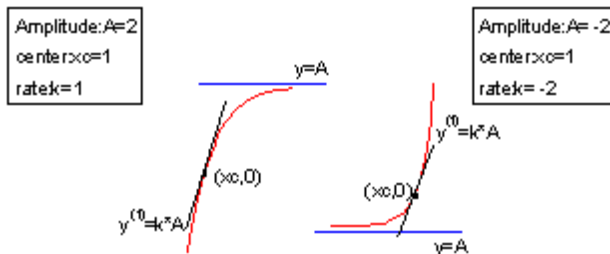
$$y = A(1 - e^{-k(x-xc)})$$

Brief Description

Monomolecular growth model.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. p. 328

Sample Curve



Parameters

Number: 3

Names: A, xc, k

Meanings: A = amplitude, xc = center, k = rate

Initial Values: A = 2.0 (vary), xc = 1.0 (vary), k = 1.0 (vary)

Lower Bounds: A > 0.0

Upper Bounds: none

Script Access

mnmolecular(x,A,xc,k)

Function File

FITFUNC\MMOLECU.FDF

MnMolecular1

Function

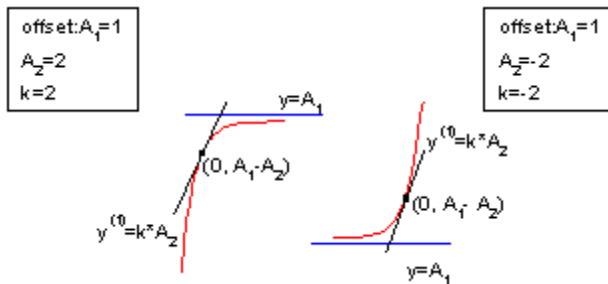
$$y = A_1 - A_2 e^{-kx}$$

Brief Description

Monomolecular growth model.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. p. 328

Sample Curve



Parameters

Number: 3

Names: A1, A2, k

Meanings: A1 = offset, A2 = coefficient, k = coefficient

Initial Values: A1 = 1.0 (vary), A2 = 1.0 (vary), k = 1.0 (vary)

Lower Bounds: A1 > 0.0, A2 > 0.0

Upper Bounds: none

Script Access

mnmolecular1(x,A1,A2,k)

Function File

FITFUNC\MMOLECU1.FDF

Shah

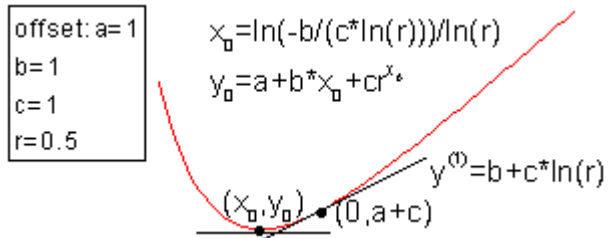
Function

$$y = a + bx + cr^x$$

Brief Description

Shah model.

Sample Curve



Parameters

Number: 4

Names: a, b, c, r

Meanings: a = offset, b = coefficient, c = coefficient, r = unknown

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 1.0 (vary), r = 0.5 (vary)

Lower Bounds: $r > 0.0$

Upper Bounds: $r < 1.0$

Script Access

shah(x,a,b,c,r)

Function File

FITFUNC\SHAH.FDF

Stirling

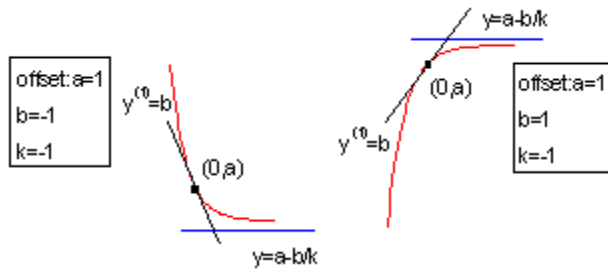
Function

$$y = a + b \left(\frac{e^{kx} - 1}{k} \right)$$

Brief Description

Stirling model.

Sample Curve



Parameters

Number: 3

Names: a, b, k

Meanings: a = offset, b = coefficient, k = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), k = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

stirling(x,a,b,k)

Function File

FITFUNC\STIRLING.FDF

YldFert

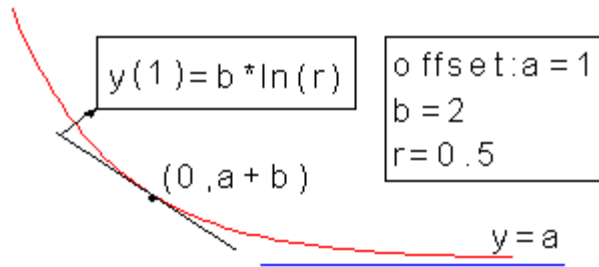
Function

$$y = a + br^x$$

Brief Description

Yield-fertilizer model in agriculture and learning curve in psychology.

Sample Curve



Parameters

Number: 3

Names: a, b, r

Meanings: a = offset, b = coefficient, r = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), r = 0.5 (vary)

Lower Bounds: $r > 0.0$

Upper Bounds: $r < 1.0$

Script Access

yldfert(x,a,b,r)

Function File

FITFUNC\YLDFERT.FDF

YldFert1

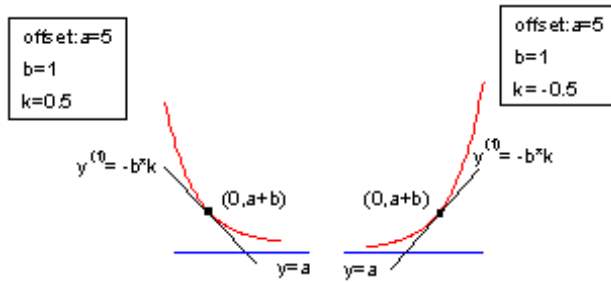
Function

$$y = a + be^{-kx}$$

Brief Description

Yield-fertilizer model in agriculture and learning curve in psychology.

Sample Curve



Parameters

Number: 3

Names: a, b, k

Meanings: a = offset, b = coefficient, k = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), k = 0.5 (vary)

Lower Bounds: $k > 0.0$

Upper Bounds: none

Script Access

yldfert1(x,a,b,k)

Function File

FITFUNC\YLDFERT1.FDF

4. Growth/Sigmoidal

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Boltzmann

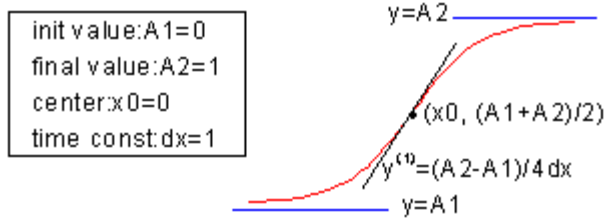
Function

$$y = \frac{A_1 - A_2}{1 + e^{(x-x_0)/dx}} + A_2$$

Brief Description

Boltzmann function - produces a sigmoidal curve.

Sample Curve



Parameters

Number: 4

Names: A1, A2, x0, dx

Meanings: A1 = initial value, A2 = final value, x0 = center, dx = time constant

Initial Values: A1 = 0.0 (vary), A2 = 1.0 (vary), x0 = 0.0 (vary), dx = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Constraints

$dx \neq 0$

Script Access

boltzman(x,A1,A2,x0,dx)

Function File

FITFUNC\BOLTZMAN.FDF

Hill

Function

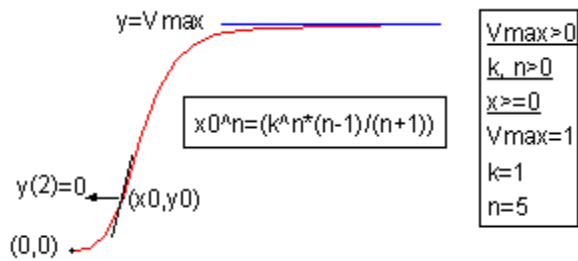
$$y = V_{\max} \frac{x^n}{k^n + x^n}$$

Brief Description

Hill function.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. p. 120

Sample Curve



Parameters

Number: 3

Names: Vmax, k, n

Meanings: Vmax = unknown, k = unknown, n = unknown

Initial Values: Vmax = 1.0 (vary), k = 1.0 (vary), n = 1.5 (vary)

Lower Bounds: Vmax > 0

Upper Bounds: none

Script Access

hill(x, Vmax, k, n)

Function File

FITFUNC\HILL.FDF

Logistic

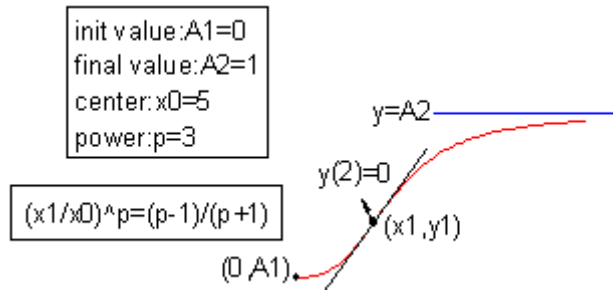
Function

$$y = \frac{A_1 - A_2}{1 + (x/x_0)^p} + A_2$$

Brief Description

Logistic dose response in pharmacology/chemistry.

Sample Curve



Parameters

Number: 4

Names: A1, A2, x0, p

Meanings: A1 = initial value, A2 = final value, x0 = center, p = power

Initial Values: A1 = 0.0 (vary), A2 = 1.0 (vary), x0 = 1.0 (vary), p = 1.5 (vary)

Lower Bounds: p > 0.0

Upper Bounds: none

Script Access

logistic(x,A1,A2,x0,p)

Function File

FITFUNC\LOGISTIC.FDF

SGompertz

Function

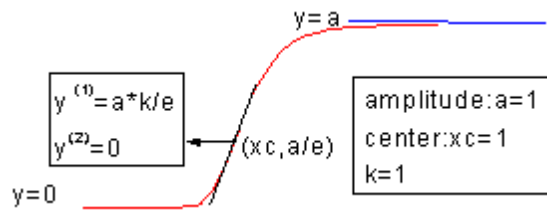
$$y = ae^{-\exp(-k(x-x_c))}$$

Brief Description

Gompertz growth model for population studies, animal growth.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. pp. 330 - 331

Sample Curve



Parameters

Number: 3

Names: a, xc, k

Meanings: a = amplitude, xc = center, k = coefficient

Initial Values: a = 1.0 (vary), xc = 1.0 (vary), k = 1.0 (vary)

Lower Bounds: a > 0.0, k > 0.0

Upper Bounds: none

Script Access

sgompertz(x,a,xc,k)

Function File

FITFUNC\GOMPertz.FDF

SLogistic1

Function

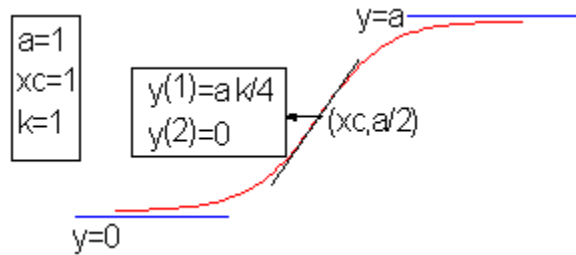
$$y = \frac{a}{1 + e^{-k(x-x_c)}}$$

Brief Description

Sigmoidal logistic function, type 1.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. pp. 328 - 330

Sample Curve



Parameters

Number: 3

Names: a, xc, k

Meanings: a = amplitude, xc = center, k = coefficient

Initial Values: a = 1.0 (vary), xc = 1.0 (vary), k = 1.0 (vary)

Lower Bounds: xc > 0

Upper Bounds: none

Script Access

slogistic1(x,a,xc,k)

Function File

FITFUNC\SLOGIST1.FDF

SLogistic2

Function

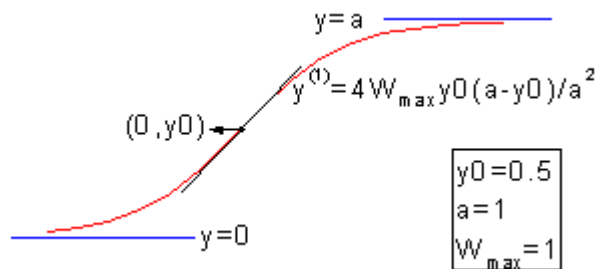
$$y = \frac{a}{1 + \frac{a - y_0}{y_0} e^{-4W_{\max}x/a}}$$

Brief Description

Sigmoidal logistic function, type 2.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. pp. 328 - 330

Sample Curve



Parameters

Number: 3

Names: y_0 , a , W_{\max}

Meanings: y_0 = initial value, a = amplitude, W_{\max} = maximum growth rate

Initial Values: $y_0 = 0.5$ (vary), $a = 1.0$ (vary), $W_{\max} = 1.0$ (vary)

Lower Bounds: $y_0 > 0.0$, $a > 0.0$, $W_{\max} > 0.0$

Upper Bounds: none

Script Access

slogistic2(x,y0,a,Wmax)

Function File

FITFUNC\SLOGIST2.FDF

SLogistic3

Function

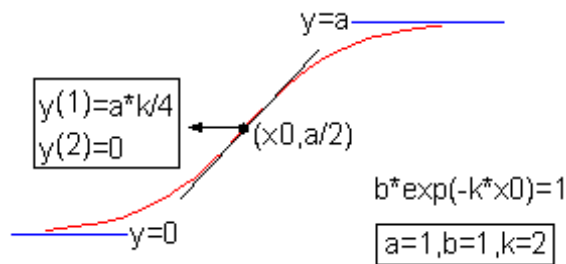
$$y = \frac{a}{1 + be^{-kx}}$$

Brief Description

Sigmoidal logistic function, type 3.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. pp. 328 - 330

Sample Curve



Parameters

Number: 3

Names: a, b, k

Meanings: a = amplitude, b = coefficient, k = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), k = 1.0 (vary)

Lower Bounds: a > 0.0, b > 0.0, k > 0.0

Upper Bounds: none

Script Access

slogistic3(x,a,b,k)

Function File

FITFUNC\SLOGIST3.FDF

SRichards1

Function

$$y = \left[a^{1-d} - e^{-k(x-xc)} \right]^{1/(1-d)}, d < 1$$

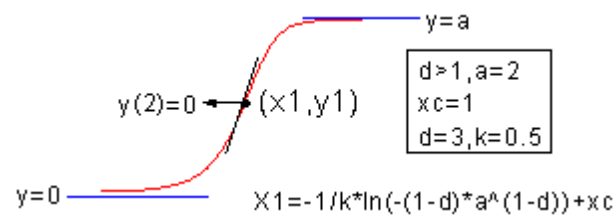
$$y = \left[a^{1-d} + e^{-k(x-xc)} \right]^{1/(1-d)}, d > 1$$

Brief Description

Sigmoidal Richards function, type 1.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. pp. 332 - 337

Sample Curve



Parameters

Number: 4

Names: a, xc, d, k

Meanings: a = unknown, xc = center, d = unknown, k = coefficient

Initial Values: a = 1.0 (vary), xc = 1.0 (vary), d = 5 (vary), k = 0.5 (vary)

Lower Bounds: a > 0.0, k > 0.0

Upper Bounds: none

Script Access

srichards1(x,a,xc,d,k)

Function File

FITFUNC\SRICHAR1.FDF

SRichards2

Function

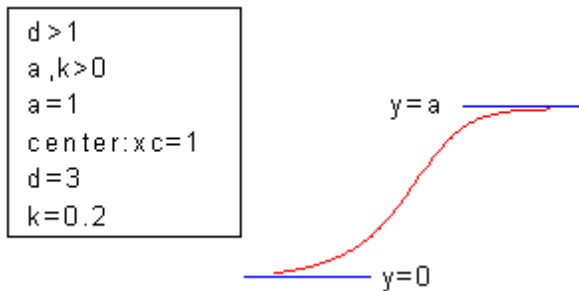
$$y = a \left[1 + (d - 1) e^{-k(x-xc)} \right]^{1/(1-d)}, d \neq 1$$

Brief Description

Sigmoidal Richards function, type 2.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. pp. 332 - 337

Sample Curve



Parameters

Number: 4

Names: a, xc, d, k

Meanings: a = unknown, xc = center, d = unknown, k = coefficient

Initial Values: a = 1.0 (vary), xc = 1.0 (vary), d = 5.0 (vary), k = 1.0 (vary)

Lower Bounds: a > 0.0, k > 0.0

Upper Bounds: none

Script Access

srichards2(x,a,xc,d,k)

Function File

FITFUNC\SRICHAR2.FDF

SWeibull1

Function

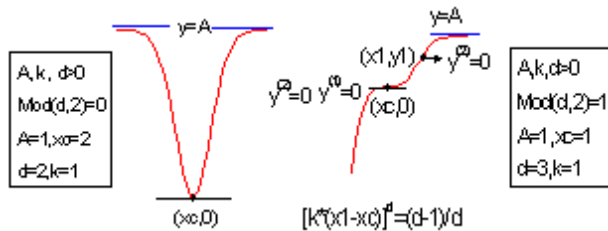
$$y = A \left(1 - e^{-k(x-x_c)^d} \right)$$

Brief Description

Sigmoidal Weibull function, type 1.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. pp. 338 - 339

Sample Curve



Parameters

Number: 4

Names: A, xc, d, k

Meanings: A = amplitude, xc = center, d = power, k = coefficient

Initial Values: A = 1.0 (vary), xc = 1.0 (vary), d = 5.0 (vary), k = 1.0 (vary)

Lower Bounds: A > 0.0, k > 0.0

Upper Bounds: none

Script Access

sweibull1(x,A,xc,d,k)

Function File

FITFUNC\WEIBULL1.FDF

SWeibull2

Function

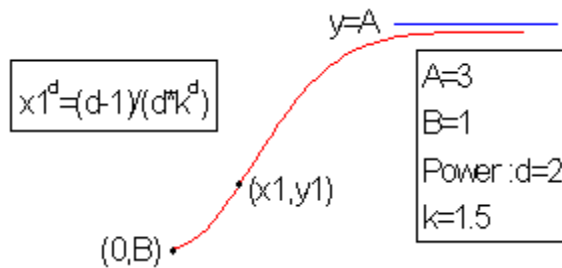
$$y = A - (A - B)e^{-(kx)^d}$$

Brief Description

Sigmoidal Weibull function, type 2.

Reference: Seber, G. A. F., Wild, C. J. 1989. *Nonlinear Regression*. John Wiley & Sons, Inc. pp. 338 - 339

Sample Curve



Parameters

Number: 4

Names: a, b, d, k

Meanings: a = unknown, b = unknown, d = power, k = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), d = 5.0 (vary), k = 1.0 (vary)

Lower Bounds: a > 0.0, b > 0.0, k > 0.0

Upper Bounds: none

Script Access

sweibull2(x,a,b,d,k)

Function File

FITFUNC\WEIBULL2.FDF

5. Hyperbola Functions

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Dhyperbl

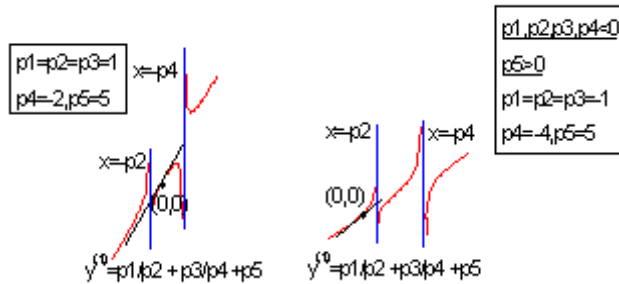
Function

$$y = \frac{P_1 x}{P_2 + x} + \frac{P_3 x}{P_4 + x} + P_5 x$$

Brief Description

Double rectangular hyperbola function.

Sample Curve



Parameters

Number: 5

Names: P1, P2, P3, P4, P5

Meanings: Unknowns 1-5

Initial Values: P1 = 1.0 (vary), P2 = 1.0 (vary), P3 = 1.0 (vary), P4 = 1.0 (vary), P5 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

dhyperbl(x,P1,P2,P3,P4,P5)

Function File

FITFUNC\DHYPERBL.FDF

Hyperbl

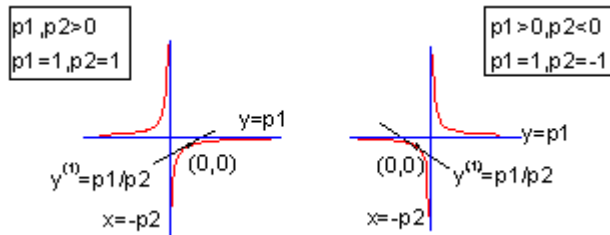
Function

$$y = \frac{P_1 x}{P_2 + x}$$

Brief Description

Hyperbola function. Also the Michaelis-Menten model in enzyme kinetics.

Sample Curve



Parameters

Number: 2

Names: P1, P2

Meanings: P1 = amplitude, P2 = unknown

Initial Values: P1 = 1.0 (vary), P2 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

hyperbl(x,P1,P2)

Function File

FITFUNC\HYPERBL.FDF

HyperbolaGen

Function

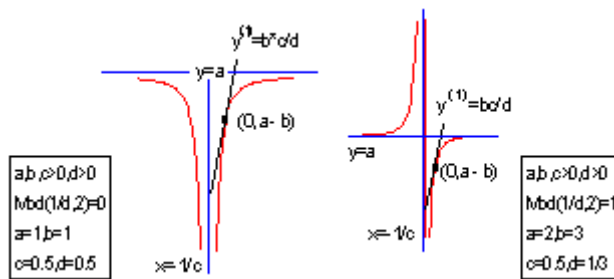
$$y = a - \frac{b}{(1 + cx)^{1/d}}$$

Brief Description

Generalized hyperbola function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.4.7

Sample Curve



Parameters

Number: 4

Names: a, b, c, d

Meanings: a = coefficient, b = coefficient, c = coefficient, d = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5, d = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

hyperbolagen(x,a,b,c,d)

Function File

FITFUNC\HYPERGEN.FDF

HyperbolaMod

Function

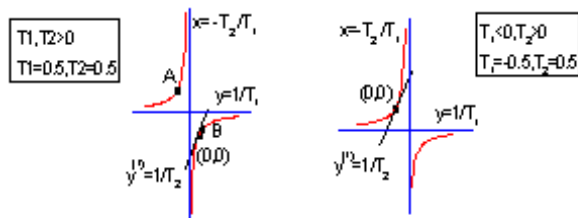
$$y = \frac{x}{\theta_1 x + \theta_2}$$

Brief Description

Modified hyperbola function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.2.18

Sample Curve



$$A \left(\frac{T_2 T_1 + \sqrt{T_2^2 y T_1 + T_1^2}}{T_1 + \sqrt{T_2^2 y T_1 + T_1^2}} \right) \quad B \left(\frac{-T_2 T_1 + \sqrt{T_2^2 y T_1 + T_1^2}}{1/T_1 + \sqrt{T_2^2 y T_1 + T_1^2}} \right)$$

Parameters

Number: 2

Names: T1, T2

Meanings: T1 = amplitude, T2 = unknown

Initial Values: T1 = 1.0 (vary), T2 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

hyperbolamod(x, T1, T2)

Function File

FITFUNC\HYPERBMD.FDF

RectHyperbola

Function

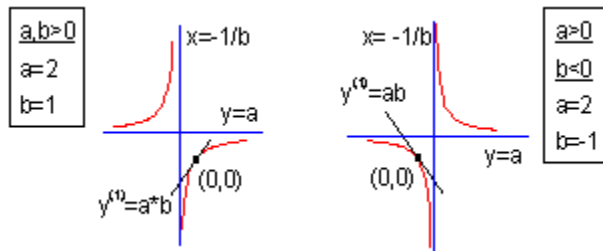
$$y = a \frac{bx}{1 + bx}$$

Brief Description

Rectangular hyperbola function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.2.16

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

recthyperbola(x,a,b)

Function File

FITFUNC\RECTHYPB.FDF

6. Logarithm Functions

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<i>Log3P1</i>	91
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Bradley

Function

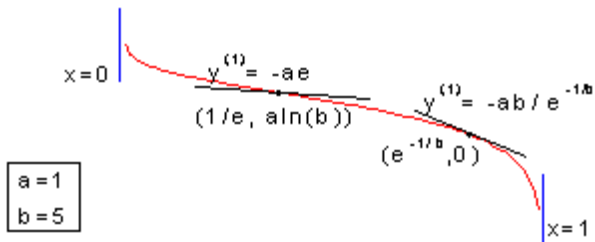
$$y = a \ln(-b \ln(x))$$

Brief Description

Bradley model.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 3.3.7

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = unknown, b = unknown

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

bradley(x,a,b)

Function File

FITFUNC\BRADLEY.FDF

Log2P1

Function

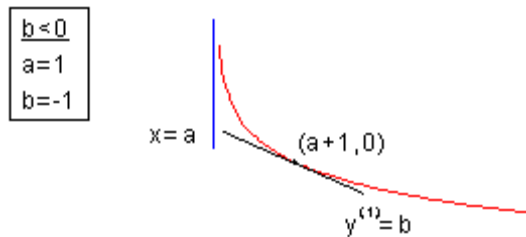
$$y = b \ln(x - a)$$

Brief Description

Two-parameter logarithm function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.2.1

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = offset, b = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

log2p1(x,a,b)

Function File

FITFUNC\LOG2P1.FDF

Log2P2

Function

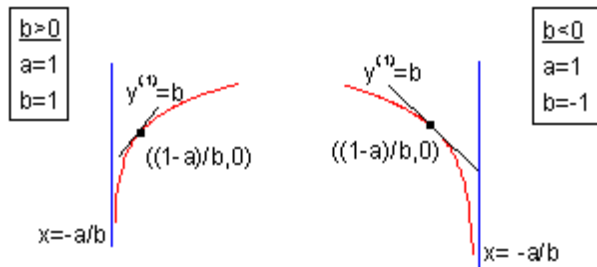
$$y = \ln(a + bx)$$

Brief Description

Two-parameter logarithm.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.2.3

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = offset, b = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

log2p2(x,a,b)

Function File

FITFUNC\LOG2P2.FDF

Log3P1

Function

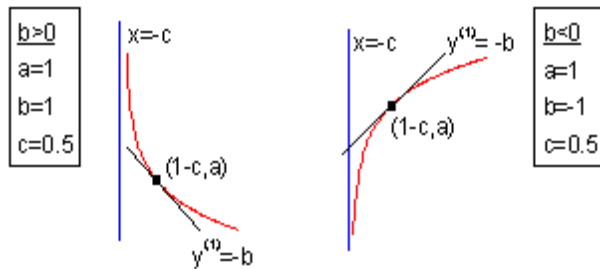
$$y = a - b \ln(x + c)$$

Brief Description

Three-parameter logarithm function.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.3.32

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

log3p1(x,a,b,c)

Function File

FITFUNC\LOG3P1.FDF

Logarithm

Function

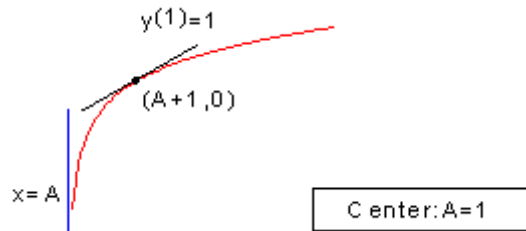
$$y = \ln(x - A)$$

Brief Description

One-parameter logarithm.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.1.1

Sample Curve



Parameters

Number: 1

Names: A

Meanings: A = center

Initial Values: A = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

logarithm(x,A)

Function File

FITFUNC\LOGARITH.FDF

7. Peak Functions

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Asym2Sig

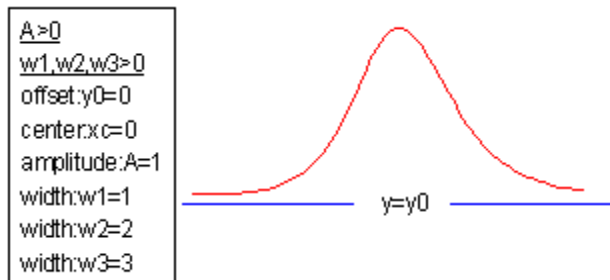
Function

$$y = y_0 + A \frac{1}{1 + e^{\frac{x-x_c+w_1/2}{w_2}}} \left(1 - \frac{1}{1 + e^{\frac{x-x_c-w_1/2}{w_3}}} \right)$$

Brief Description

Asymmetric double sigmoidal.

Sample Curve



Parameters

Number: 6

Names: y0, xc, A, w1, w2, w3

Meanings: y0 = offset, xc = center, A = amplitude, w1 = width, w2 = width, w3 = width

Initial Values: y0 = 0.0 (vary), xc = 0.0 (vary), A = 1.0 (vary), w1 = 1.0 (vary), w2 = 1.0 (vary), w3 = 1.0 (vary)

Lower Bounds: w1 > 0.0, w2 > 0.0, w3 > 0.0

Upper Bounds: none

Script Access

asym2sig(x,y0,xc,A,w1,w2,w3)

Function File

FITFUNC\ASYMDBLS.FDF

Beta

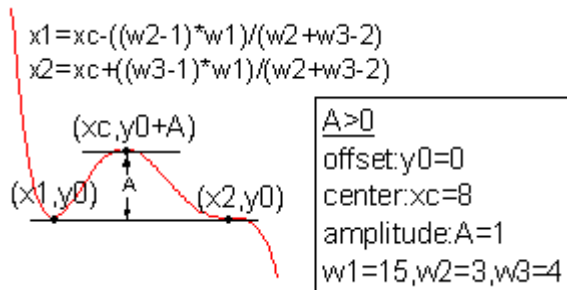
Function

$$y = y_0 + A \left[1 + \left(\frac{w_2 + w_3 - 2}{w_2 - 1} \right) \left(\frac{x - x_c}{w_1} \right) \right]^{w_2 - 1} \left[1 - \left(\frac{w_2 + w_3 - 2}{w_3 - 1} \right) \left(\frac{x - x_c}{w_1} \right) \right]^{w_3 - 1}$$

Brief Description

The beta function.

Sample Curve



Parameters

Number: 6

Names: y_0 , x_c , A , w_1 , w_2 , w_3

Meanings: y_0 = offset, x_c = center, A = amplitude, w_1 = width, w_2 = width, w_3 = width

Initial Values: $y_0 = 0.0$ (vary), $x_c = 1.0$ (vary), $A = 5.0$ (vary), $w_1 = 5.0$ (vary), $w_2 = 2.0$ (vary), $w_3 = 2.0$ (vary)

Lower Bounds: $w_1 > 0.0$, $w_2 > 1.0$, $w_3 > 1.0$

Upper Bounds: none

Script Access

beta(x,y0,xc,A,w1,w2,w3)

Function File

FITFUNC\BETA.FDF

CCE

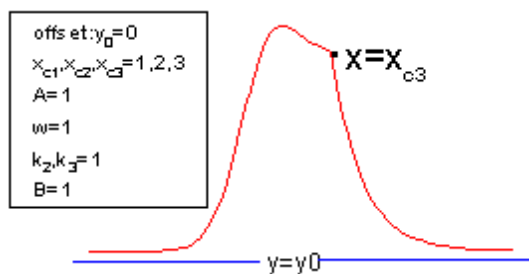
Function

$$y = y_0 + A \left[e^{-\frac{(x-x_{c1})^2}{2w}} + B(1 - 0.5(1 - \tanh(k_2(x - x_{c2})))) e^{0.5k_3(|x-x_{c3}|+(x-x_{c3}))} \right]$$

Brief Description

Chesler-Cram peak function for use in chromatography.

Sample Curve



Parameters

Number: 9

Names: y_0 , x_{c1} , A , w , k_2 , x_{c2} , B , k_3 , x_{c3}

Meanings: y_0 = offset, x_{c1} = unknown, A = unknown, w = unknown, k_2 = unknown, x_{c2} = unknown, B = unknown, k_3 = unknown, x_{c3} = unknown

Initial Values: $y_0 = 0.0$ (vary), $x_{c1} = 1.0$ (vary), $A = 1.0$ (vary), $w = 1.0$ (vary), $k_2 = 1.0$ (vary), $x_{c2} = 1.0$ (vary), $B = 1.0$ (vary), $k_3 = 1.0$ (vary), $x_{c3} = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

cce(x,y0,xc1,A,w,k2,xc2,B,k3,xc3)

Function File

FITFUNC\CHESLECR.FDF

ECS

Function

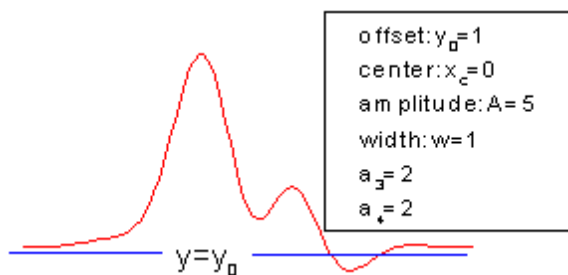
$$y = y_0 + \frac{A}{w\sqrt{2\pi}} \left\{ e^{-0.5z^2} \left(1 + \frac{a_3}{3!} z(z^2 - 3) + \frac{a_4}{4!} (z^4 - 6z^3 + 3) \right) + \frac{10a_3^2}{6!} (z^6 - 15z^4 + 45z^2 - 15) \right\}$$

where $z = \frac{x - x_c}{w}$

Brief Description

Edgeworth-Cramer peak function for use in chromatography.

Sample Curve



Parameters

Number: 6

Names: y_0 , x_c , A , w , a_3 , a_4

Meanings: y_0 = offset, x_c = center, A = amplitude, w = width, a_3 = unknown, a_4 = unknown

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $A = 1.0$ (vary), $w = 1.0$ (vary), $a_3 = 1.0$ (vary), $a_4 = 1.0$ (vary)

Lower Bounds: $A > 0.0$, $w > 0.0$

Upper Bounds: none

Script Access

ecs(x,y0,xc,A,w,a3,a4)

Function File

FITFUNC\EDGWTHCR.FDF

Extreme

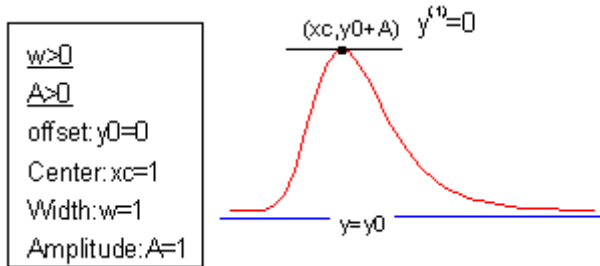
Function

$$y = y_0 + Ae \left[-\exp \left[-\left(\frac{x - x_c}{w} \right) \right] - \left(\frac{x - x_c}{w} \right) + 1 \right]$$

Brief Description

Extreme function in statistics.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = amplitude

Initial Values: $y_0 = 0.0$ (vary), $x_c = 1.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

extreme(x,y0,xc,w,A)

Function File

FITFUNC\EXTREME.FDF

Gauss

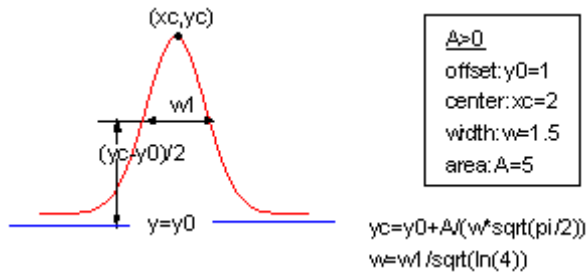
Function

$$y = y_0 + \frac{A}{w\sqrt{\pi/2}} e^{-2\frac{(x-x_c)^2}{w^2}}$$

Brief Description

Area version of Gaussian function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 10$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

gauss(x,y0,xc,w,A)

Function File

FITFUNC\GAUSS.FDF

GaussAmp

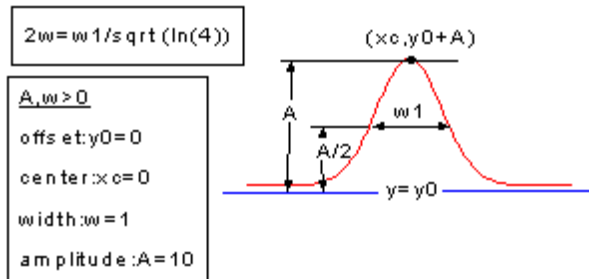
Function

$$y = y_0 + Ae^{-\frac{(x-x_c)^2}{2w^2}}$$

Brief Description

Amplitude version of Gaussian peak function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 10$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

gaussamp(x,y0,xc,w,A)

Function File

FITFUNC\GAUSSAMP.FDF

GaussMod

Function

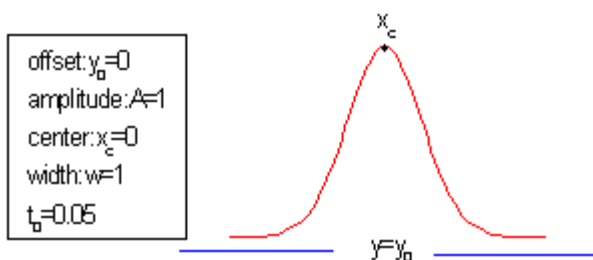
$$f(x) = y_0 + \frac{A}{t_0} e^{\frac{1}{2} \left(\frac{w}{t_0} \right)^2 \frac{x-x_c}{t_0}} \int_{-\infty}^z \frac{1}{\sqrt{2\pi}} e^{-\frac{y^2}{2}} dy$$

where $z = \frac{x - x_c}{w} - \frac{w}{t_0}$

Brief Description

Exponentially modified Gaussian peak function for use in chromatography.

Sample Curve



Parameters

Number: 5

Names: y_0 , A , x_c , w , t_0

Meanings: y_0 = offset, A = amplitude, x_c = center, w = width, t_0 = unknown

Initial Values: $y_0 = 0.0$ (vary), $A = 1.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $t_0 = 0.05$ (vary)

Lower Bounds: $w > 0.0$, $t_0 > 0.0$

Upper Bounds: none

Script Access

gaussmod(x,y0,A,xc,w,t0)

Function File

FITFUNC\GAUSSMOD.FDF

GCAS

Function

$$f(z) = y_0 + \frac{A}{w\sqrt{2\pi}} e^{-z^2/2} \left(1 + \sum_{i=3}^4 \frac{a_i}{i!} H_i(z) \right)$$

$$z = \frac{x - x_c}{w}$$

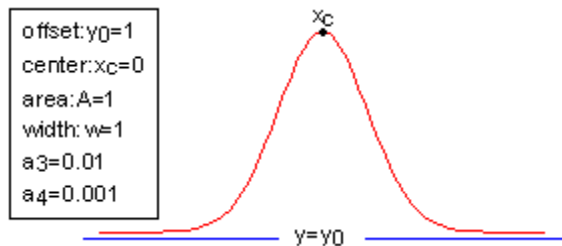
$$H_3 = z^3 - 3z$$

$$H_4 = z^4 - 6z^2 + 3$$

Brief Description

Gram-Charlier peak function for use in chromatography.

Sample Curve



Parameters

Number: 6

Names: y₀, x_c, A, w, a₃, a₄

Meanings: y₀ = offset, x_c = center, A = amplitude, w = width, a₃ = unknown, a₄ = unknown

Initial Values: y₀ = 0.0 (vary), x_c = 0.0 (vary), A = 1.0 (vary), w = 1.0 (vary), a₃ = 0.01 (vary), a₄ = 0.001 (vary)

Lower Bounds: w > 0.0

Upper Bounds: none

Script Access

gcas(x,y₀,x_c,A,w,a₃,a₄)

Function File

FITFUNC\GRMCHARL.FDF

Giddings

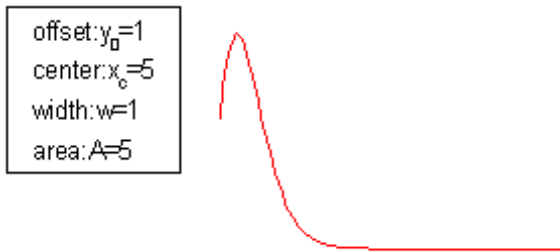
Function

$$y = y_0 + \frac{A}{w} \sqrt{\frac{x_c}{x}} I_1 \left(\frac{2\sqrt{x_c x}}{w} \right) e^{-\frac{x-x_c}{w}}$$

Brief Description

Giddings peak function for use in chromatography.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 1.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

giddings(x, y_0, x_c, w, A)

Function File

FITFUNC\GIDDINGS.FDF

InvsPoly

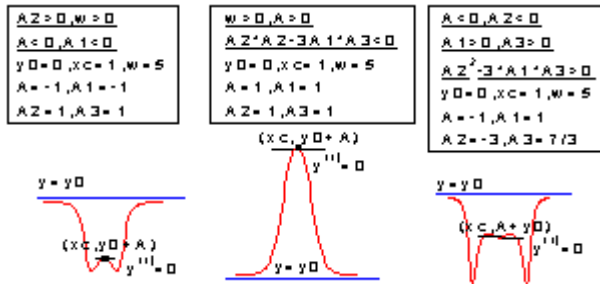
Function

$$y = y_0 + \frac{A}{1 + A_1 \left(2 \frac{x - x_c}{w}\right)^2 + A_2 \left(2 \frac{x - x_c}{w}\right)^4 + A_3 \left(2 \frac{x - x_c}{w}\right)^6}$$

Brief Description

Inverse polynomial peak function with center.

Sample Curve



Parameters

Number: 7

Names: $y_0, x_c, w, A, A_1, A_2, A_3$

Meanings: y_0 = offset, x_c = center, w = width, A = amplitude, A_1 = coefficient, A_2 = coefficient, A_3 = coefficient

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary), $A_1 = 0.0$ (vary), $A_2 = 0.0$ (vary), $A_3 = 0.0$ (vary)

Lower Bounds: $w > 0.0, A_1 \geq 0.0, A_2 \geq 0.0, A_3 \geq 0.0$

Upper Bounds: none

Script Access

invspoly(x,y0,xc,w,A,A1,A2,A3)

Function File

FITFUNC\INVSPOLY.FDF

LogNormal

Function

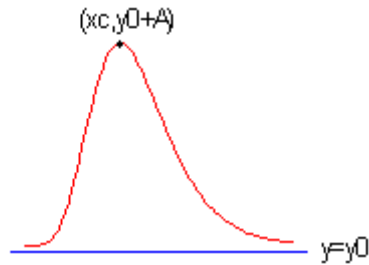
$$y = y_0 + \frac{A}{\sqrt{2\pi wx}} e^{-\frac{[\ln x/x_c]^2}{2w^2}}$$

Brief Description

Log-Normal function.

Sample Curve

$A, w > 0$
offset: $y_0 = 0$
center: $x_c = 150$
width: $w = 0.3$
amplitude: $A = 1$



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = amplitude

Initial Values: $y_0 = 0.0$ (vary), $x_c = 1.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $x_c > 0$, $w > 0$

Upper Bounds: none

Script Access

lognormal(x,y0,xc,w,A)

Function File

FITFUNC\LOGNORM.FDF

Logistpk

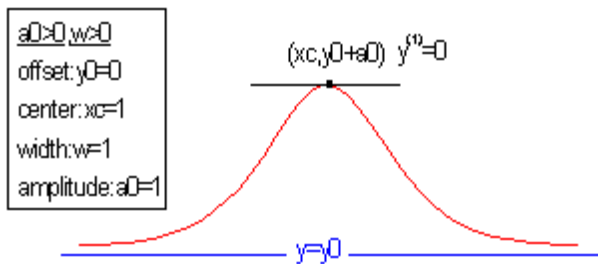
Function

$$y = y_0 + \frac{4Ae^{-\frac{x-xc}{w}}}{\left(1 + e^{-\frac{x-xc}{w}}\right)^2}$$

Brief Description

Logistic peak function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = amplitude

Initial Values: $y_0 = 0.0$ (vary), $x_c = 1.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

logistpk(x,y0,xc,w,A)

Function File

FITFUNC\LOGISTPK

Lorentz

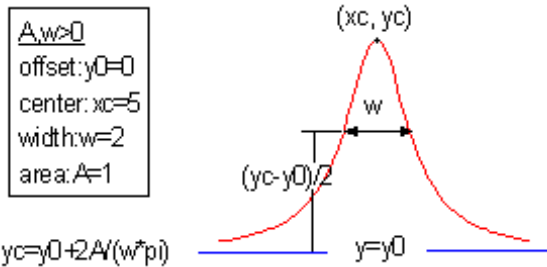
Function

$$y = y_0 + \frac{2A}{\pi} \frac{w}{4(x - x_c)^2 + w^2}$$

Brief Description

Lorentzian peak function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

lorentz(x,y0,xc,w,A)

Function File

FITFUNC\LORENTZ.FDF

PearsonVII

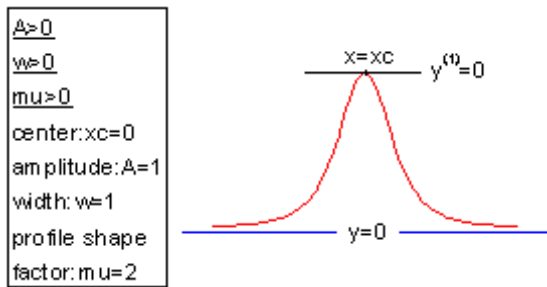
Function

$$y = A \frac{2\sqrt{\mu} e^{\left(\Gamma(2^{1/\mu}-1)\right)}}{\pi e^{\left(\Gamma(\mu-1/2)\right)}} \left[1 + 4 \frac{2^{1/\mu} - 1}{w^2} (x - x_c)^2 \right]^{-\mu}$$

Brief Description

Pearson VII peak function.

Sample Curve



Parameters

Number: 4

Names: x_c , A , w , μ

Meanings: x_c = center, A = amplitude, w = width, μ = profile shape factor

Initial Values: $x_c = 0.0$ (vary), $A = 1.0$ (vary), $w = 1.0$ (vary), $\mu = 1.0$ (vary)

Lower Bounds: $A > 0.0$, $w > 0.0$, $\mu > 0.0$

Upper Bounds: none

Script Access

pearson7(x,xc,A,w,mu)

Function File

FITFUNC\PEARSON7.FDF

PsdVoigt1

Function

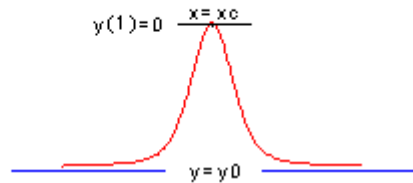
$$y = y_0 + A \left[m_u \frac{2}{\pi} \frac{w}{4(x-x_c)^2 + w^2} + (1 - m_u) \frac{\sqrt{4 \ln 2}}{\sqrt{\pi} w} e^{-\frac{4 \ln 2}{w^2}(x-x_c)^2} \right]$$

Brief Description

Pseudo-Voigt peak function type 1.

Sample Curve

```
A > 0
w > 0
mu > 0
offset:y0=0
center:xc=0
amplitude:A=1
width:w=1
profile shape
factor:mu=0.5
```



Parameters

Number: 5

Names: y0, xc, A, w, mu

Meanings: y0 = offset, xc = center, A = amplitude, w = width, mu = profile shape factor

Initial Values: y0 = 0.0 (vary), xc = 0.0 (vary), A = 1.0 (vary), w = 1.0 (vary), mu = 0.5 (vary)

Lower Bounds: w > 0.0

Upper Bounds: none

Script Access

psdvoigt1(x,y0,xc,A,w,mu)

Function File

FITFUNC\PSDVGT1.FDF

PsdVoigt2

Function

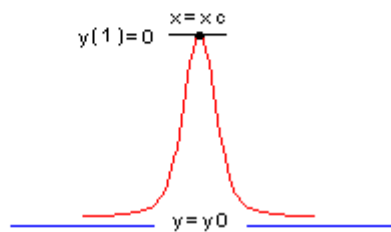
$$y = y_0 + A \left[m_u \frac{2}{\pi} \frac{w_L}{4(x - x_c)^2 + w_L^2} + (1 - m_u) \frac{\sqrt{4 \ln 2}}{\sqrt{\pi} w_G} e^{-\frac{4 \ln 2}{w_G^2} (x - x_c)^2} \right]$$

Brief Description

Pseudo-Voigt peak function type 2.

Sample Curve

```
A > 0
wG ,wL > 0
mu > 0
offset:y0=0
center:xc=0
amplitude:A=1
width:wG=1
width:wL=1
profile shape
factor:mu=0.5
```



Parameters

Number: 6

Names: y0, xc, A, wG, wL, mu

Meanings: y0 = offset, xc = center, A = amplitude, wG = width, wL = width, mu = profile shape factor

Initial Values: y0 = 0.0 (vary), xc = 0.0 (vary), A = 1.0 (vary), wG = 1.0 (vary), wL = 1.0 (vary), mu = 0.5 (vary)

Lower Bounds: wG > 0.0, wL > 0.0

Upper Bounds: none

Script Access

psdvoigt2(x,y0,xc,A,wG,wL,mu)

Function File

FITFUNC\PSDVGT2.FDF

Voigt

Function

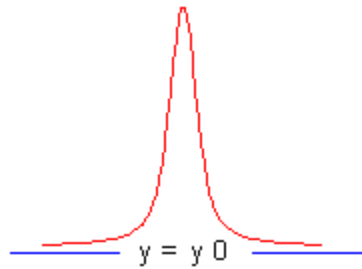
$$y = y_0 + A \cdot \frac{2 \ln 2}{\pi^{3/2}} \frac{w_L}{w_G^2} \cdot \int_{-\infty}^{\infty} \frac{e^{-t^2}}{\left(\sqrt{\ln 2} \frac{w_L}{w_G} \right)^2 + \left(\sqrt{4 \ln 2} \frac{x - x_c}{w_G} - t \right)^2} dt$$

Brief Description

Voigt peak function.

Sample Curve

$A > 0$
offset: $y_0=0$
center: $x_c=5$
amplitude: $A=1$
$w_G=1, w_L=1$



Parameters

Number: 5

Names: y_0 , x_c , A , w_G , w_L

Meanings: y_0 = offset, x_c = center, A = amplitude, w_G = Gaussian width, w_L = Lorentzian width

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $A = 1.0$ (vary), $w_G = 1.0$ (vary), $w_L = 1.0$ (vary)

Lower Bounds: $w_G > 0.0$, $w_L > 0.0$

Upper Bounds: none

Script Access

voigt5(x,y0,xc,A,wG,wL)

Function File

FITFUNC\VOIGT5.FDF

Weibull3

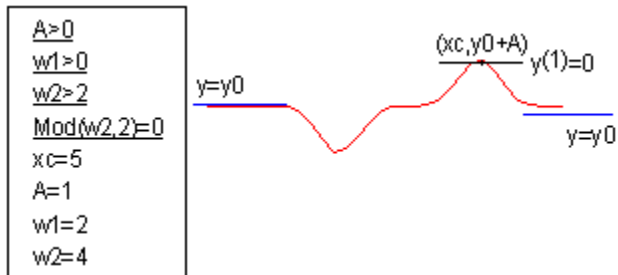
Function

$$S = \frac{x - x_c}{w_1} + \left(\frac{w_2 - 1}{w_2} \right)^{\frac{1}{w_2}}$$
$$y = y_0 + A \left(\frac{w_2 - 1}{w_2} \right)^{\frac{1-w_2}{w_2}} [S]^{w_2-1} e^{-[S]^{w_2} + \left(\frac{w_2-1}{w_2} \right)}$$

Brief Description

Weibull peak function.

Sample Curve



Parameters

Number: 5

Names: y_0 , x_c , A , w_1 , w_2

Meanings: y_0 = offset, x_c = center, A = amplitude, w_1 = width, w_2 = width

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $A = 1.0$ (vary), $w_1 = 1.0$ (vary), $w_2 = 1.0$ (vary)

Lower Bounds: $w_1 > 0.0$, $w_2 > 0.0$

Upper Bounds: none

Script Access

weibull3(x,y0,xc,A,w1,w2)

Function File

FITFUNC\WEIBULL3.FDF

8. Pharmacology Functions

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Biphasic

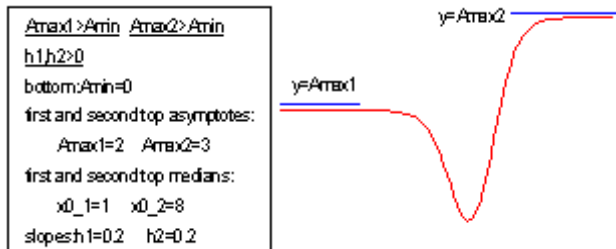
Function

$$y = A_{\min} + \frac{(A_{\max 1} - A_{\min})}{1 + 10^{((x-x_{0_1})/h1)}} + \frac{(A_{\max 2} - A_{\min})}{(1 + 10^{((x_{0_2}-x)/h2)})}$$

Brief Description

Biphasic sigmoidal dose response (7 parameters logistic equation).

Sample Curve



Parameters

Number: 7

Names: Amin, Amax1, Amax2, x0_1, x0_2, h1, h2

Meanings: Amin = bottom asymptote, Amax1 = first top asymptote, Amax2 = second top asymptote, x0_1 = first median, x0_2 = second median, h1 = slope, h2 = slope

Initial Values: Amin = 0.0 (vary), Amax1 = 1.0 (vary), Amax2 = 1.0 (vary), x0_1 = 1.0 (vary), x0_2 = 10.0 (vary), h1 = 1.0 (vary), h2 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

response2(x,Amin,Amax1,Amax2,x0_1,x0_2,h1,h2)

Function File

FITFUNC\BIPHASIC.FDF

DoseResp

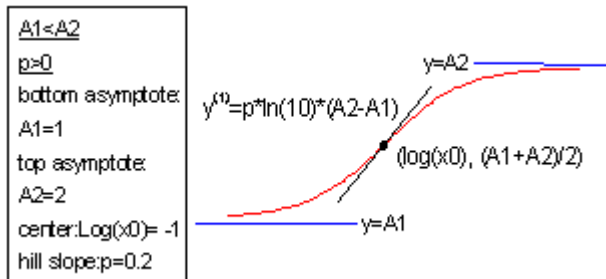
Function

$$y = A_1 + \frac{A_2 - A_1}{1 + 10^{(\log(x_0 - x))^p}}$$

Brief Description

Dose-response curve with variable Hill slope given by parameter 'p'.

Sample Curve



Parameters

Number: 4

Names: A1, A2, LOGx0, p

Meanings: A1 = bottom asymptote, A2 = top asymptote, LOGx0 = center, p = hill slope

Initial Values: A1 = 1.0 (vary), A2 = 100.0 (vary), LOGx0 = -5.0 (vary), p = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

response1(x,A1,A2,LOGx0,p)

Function File

FITFUNC\DRESP.FDF

OneSiteBind

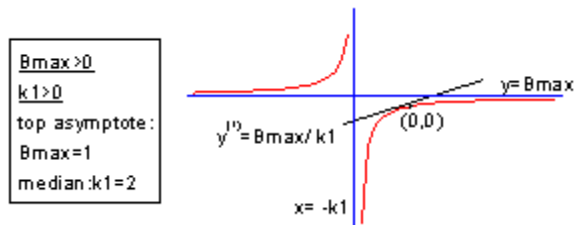
Function

$$y = \frac{B_{\max} x}{K1 + x}$$

Brief Description

One site direct binding. Rectangular hyperbola, connects to isotherm or saturation curve.

Sample Curve



Parameters

Number: 2

Names: Bmax, K1

Meanings: Bmax = top asymptote, K1 = median

Initial Values: Bmax = 1.0 (vary), K1 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

binding1(x,Bmax,K1)

Function File

FITFUNC\BIND1.FDF

OneSiteComp

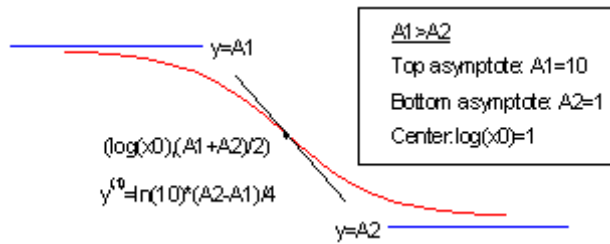
Function

$$y = A_2 + \frac{A_1 - A_2}{1 + 10^{(x - \log x_0)}}$$

Brief Description

One site competition curve. Dose-response curve with Hill slope equal to -1.

Sample Curve



Parameters

Number: 3

Names: A1, A2, log(x0)

Meanings: A1 = top asymptote, A2 = bottom asymptote, log(x0) = center

Initial Values: A1 = 10.0 (vary), A2 = 1.0 (vary), log(x0) = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

competition1(x,A1,A2,LOGx0)

Function File

FITFUNC\COMP1.FDF

TwoSiteBind

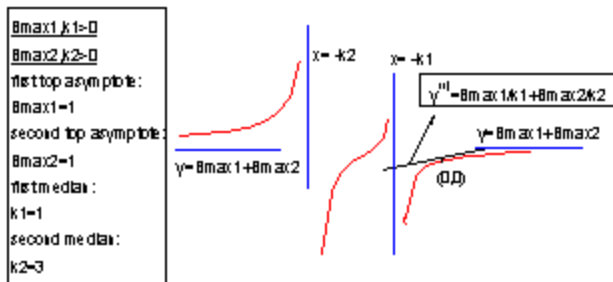
Function

$$y = \frac{B_{\max 1} x}{K_1 + x} + \frac{B_{\max 2} x}{K_2 + x}$$

Brief Description

Two site binding curve.

Sample Curve



Parameters

Number: 4

Names: Bmax1, Bmax2, k1, k2

Meanings: Bmax1 = first top asymptote, Bmax2 = second top asymptote, k1 = first median, k2 = second median

Initial Values: Bmax1 = 1.0 (vary), Bmax2 = 1.0 (vary), k1 = 1.0 (vary), k2 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

binding2(x,Bmax1,Bmax2,k1,k2)

Function File

FITFUNC\BIND2.FDF

TwoSiteComp

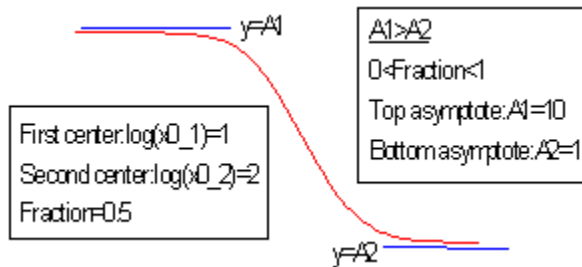
Function

$$y = A_2 + \frac{(A_1 - A_2)f}{1 + 10^{(x - \log x_{01})}} + \frac{(A_1 - A_2)(1 - f)}{1 + 10^{(x - \log x_{02})}}$$

Brief Description

Two site competition.

Sample Curve



Parameters

Number: 5

Names: A1, A2, $\log(x_{0_1})$, $\log(x_{0_2})$, f

Meanings: A1 = top asymptote, A2 = bottom asymptote, $\log(x_{0_1})$ = first center, $\log(x_{0_2})$ = second center, f = fraction

Initial Values: A1 = 10.0 (vary), A2 = 1.0 (vary), $\log(x_{0_1})$ = 1.0 (vary), $\log(x_{0_2})$ = 2.0 (vary), f = 0.5 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

competition2(x,A1,A2,LOGx0_1,LOGx0_2,f)

Function File

FITFUNC\COMP2.FDF

9. Power Functions

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Allometric1

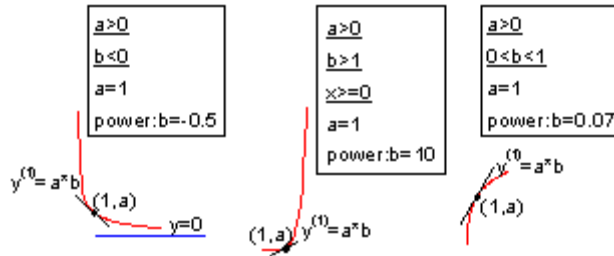
Function

$$y = ax^b$$

Brief Description

Classical Freundlich model. Has been used in the study of allometry.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = power

Initial Values: a = 1.0 (vary), b = 0.5 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

allometric1(x,a,b)

Function File

FITFUNC\ALLOMET1.FDF

Allometric2

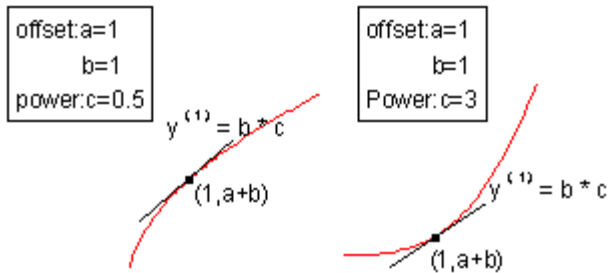
Function

$$y = a + bx^c$$

Brief Description

An extension of classical Freundlich model.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = offset, b = coefficient, c = power

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

allometric2(x,a,b,c)

Function File

FITFUNC\ALLOMET2.FDF

Asym2Sig

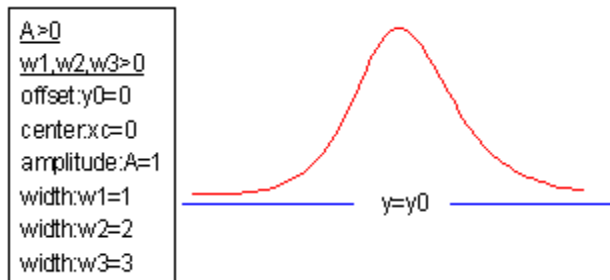
Function

$$y = y_0 + A \frac{1}{1 + e^{\frac{x-x_c+w_1/2}{w_2}}} \left(1 - \frac{1}{1 + e^{\frac{x-x_c-w_1/2}{w_3}}} \right)$$

Brief Description

Asymmetric double sigmoidal.

Sample Curve



Parameters

Number: 6

Names: y0, xc, A, w1, w2, w3

Meanings: y0 = offset, xc = center, A = amplitude, w1 = width, w2 = width, w3 = width

Initial Values: y0 = 0.0 (vary), xc = 0.0 (vary), A = 1.0 (vary), w1 = 1.0 (vary), w2 = 1.0 (vary), w3 = 1.0 (vary)

Lower Bounds: w1 > 0.0, w2 > 0.0, w3 > 0.0

Upper Bounds: none

Script Access

asym2sig(x,y0,xc,A,w1,w2,w3)

Function File

FITFUNC\ASYMDBLS.FDF

Belehradek

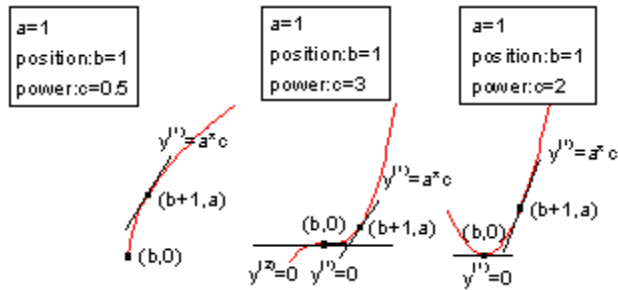
Function

$$y = a(x - b)^c$$

Brief Description

Belehradek model.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = position, c = power

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

belehradek(x,a,b,c)

Function File

FITFUNC\BELEHRAD.FDF

BINeld

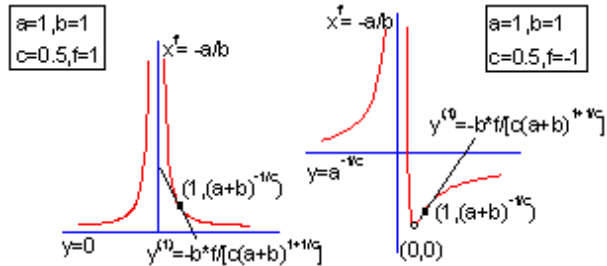
Function

$$y = (a + bx^f)^{-1/c}$$

Brief Description

Bleasdale-Nelder model.

Sample Curve



Parameters

Number: 4

Names: a, b, c, f

Meanings: a = coefficient, b = coefficient, c = coefficient, f = power

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5, f = 1.0

Lower Bounds: none

Upper Bounds: none

Script Access

blneld(x,a,b,c,f)

Function File

FITFUNC\BLNELD.FDF

BINeldSmp

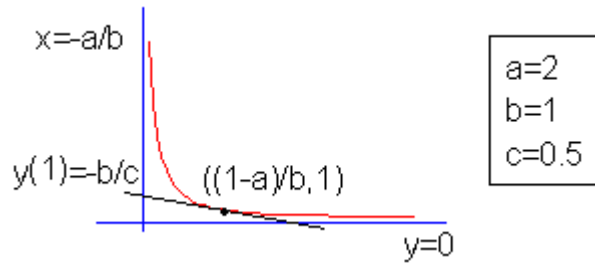
Function

$$y = (a + bx)^{-1/c}$$

Brief Description

Simplified Bleasdale-Nelder model.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

blneldsmp(x,a,b,c)

Function File

FITFUNC\BLNELDSP.FDF

FreundlichEXT

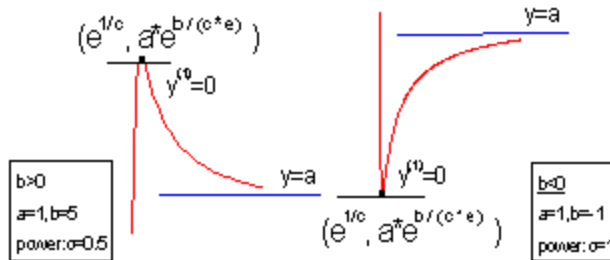
Function

$$y = ax^{bx^{-c}}$$

Brief Description

Extended Freundlich model.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = power

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

freundlichext(x,a,b,c)

Function File

FITFUNC\FRENDEXT.FDF

Gunary

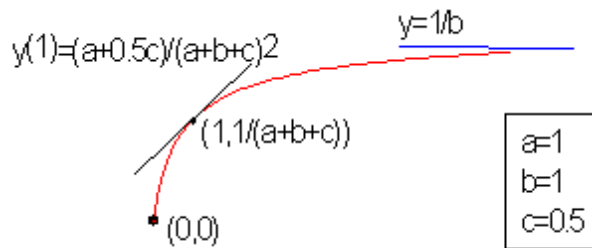
Function

$$y = \frac{x}{a + bx + c\sqrt{x}}$$

Brief Description

Gunary model.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

gunary(x,a,b,c)

Function File

FITFUNC\GUNARY.FDF

Harris

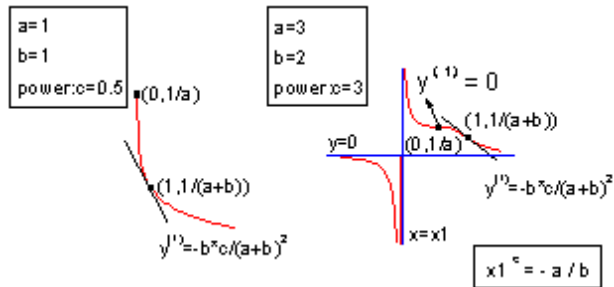
Function

$$y = (a + bx^c)^{-1}$$

Brief Description

Farazdaghi-Harris model for use in yield-density study.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = power

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

harris(x,a,b,c)

Function File

FITFUNC\HARRIS.FDF

LangmuirEXT1

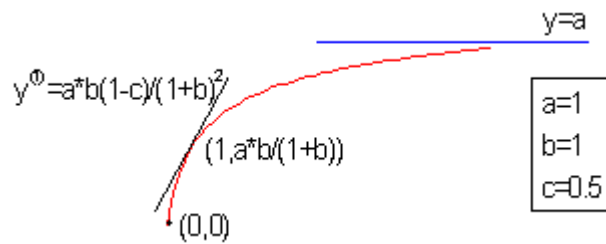
Function

$$y = \frac{abx^{1-c}}{1+bx^{1-c}}$$

Brief Description

Extended Langmuir model.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

langmuirext1(x,a,b,c)

Function File

FITFUNC\LANGEXT1.FDF

LangmuirEXT2

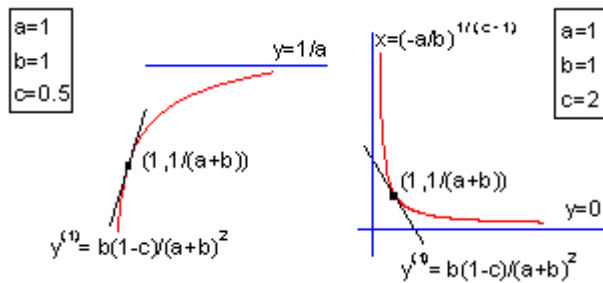
Function

$$y = \frac{1}{a + bx^{c-1}}$$

Brief Description

Extended Langmuir model.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

langmuirext2(x,a,b,c)

Function File

FITFUNC\LANGEXT2.FDF

Pareto

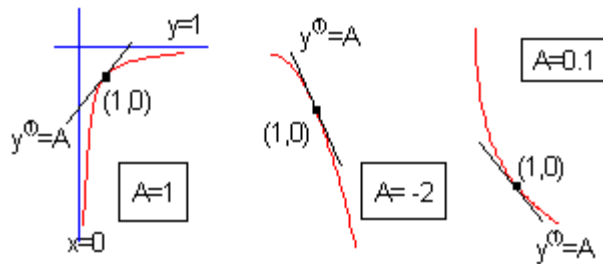
Function

$$y = 1 = \frac{1}{x^A}$$

Brief Description

Pareto function.

Sample Curve



Parameters

Number: 1

Names: A

Meanings: A = coefficient

Initial Values: A = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

pareto(x,A)

Function File

FITFUNC\PARETO.FDF

Pow2P1

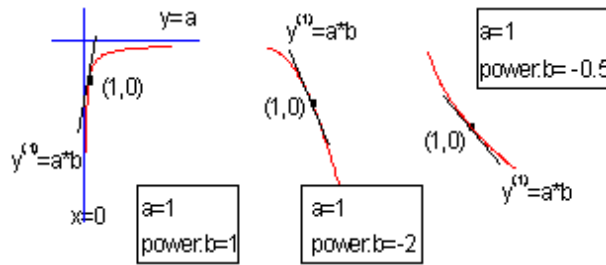
Function

$$y = a(1 - x^{-b})$$

Brief Description

Two-parameter power function.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = power

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

pow2p1(x,a,b)

Function File

FITFUNC\POW2P1.FDF

Pow2P2

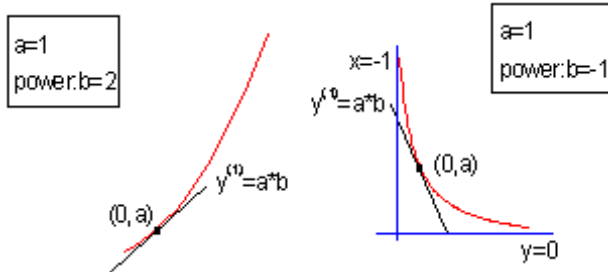
Function

$$y = a(1 + x)^b$$

Brief Description

Two-parameter power function.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = power

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

pow2p2(x,a,b)

Function File

FITFUNC/POW2P2.FDF

Pow2P3

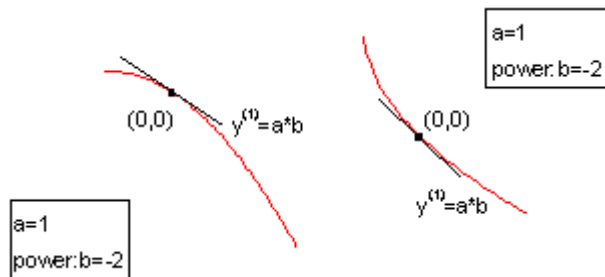
Function

$$y = 1 - \frac{1}{(1 + ax)^b}$$

Brief Description

Two-parameter power function.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = power

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

pow2p3(x,a,b)

Function File

FITFUNC\POW2P3.FDF

Power

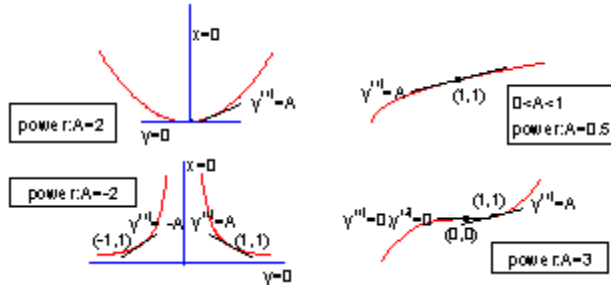
Function

$$y = x^A$$

Brief Description

One-parameter power function.

Sample Curve



Parameters

Number: 1

Names: A

Meanings: A = power

Initial Values: A = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

power(x,A)

Function File

FITFUNC\POWER.FDF

Power0

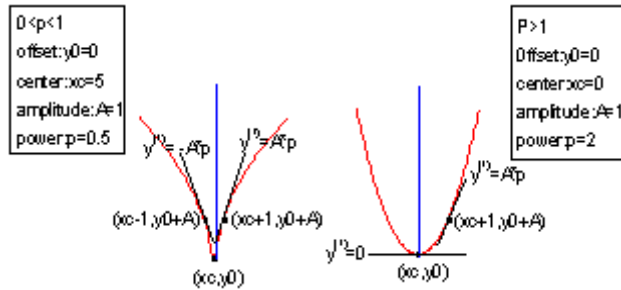
Function

$$y = y_0 + A|x - x_c|^P$$

Brief Description

Symmetric power function with offset.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , A , P

Meanings: y_0 = offset, x_c = center, A = amplitude, P = power

Initial Values: $y_0 = 0.0$ (vary), $x_c = 5.0$ (vary), $A = 1.0$ (vary), $P = 0.5$ (vary)

Lower Bounds: $A > 0.0$

Upper Bounds: none

Script Access

power0(x,y0,xc,A,P)

Function File

FITFUNC\POWER0.FDF

Power1

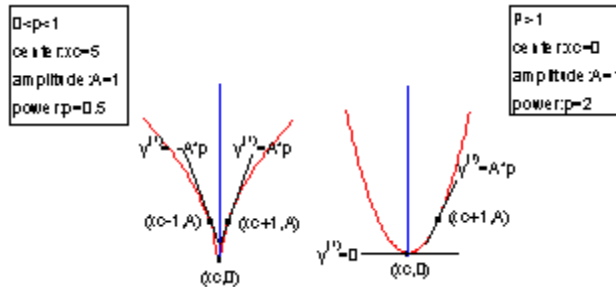
Function

$$y = A|x - x_c|^P$$

Brief Description

Symmetric power function.

Sample Curve



Parameters

Number: 3

Names: x_c , A , P

Meanings: x_c = center, A = amplitude, P = power

Initial Values: $x_c = 0.0$ (vary), $A = 1.0$ (vary), $P = 2.0$ (vary)

Lower Bounds: $A > 0.0$, $P > 0.0$

Upper Bounds: none

Script Access

power1(x,xc,A,P)

Function File

FITFUNC\POWER1.FDF

Power2

Function

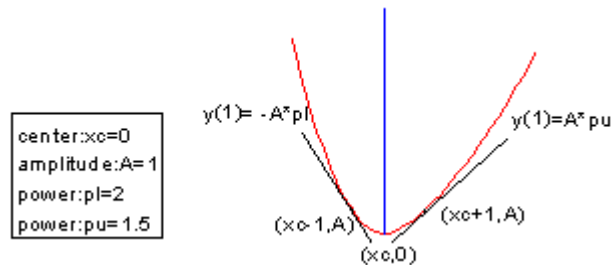
$$y = A|x - x_c|^{p_l}, x < x_c$$

$$y = A|x - x_c|^{p_u}, x > x_c$$

Brief Description

Asymmetric power function.

Sample Curve



Parameters

Number: 4

Names: xc, A, pl, pu

Meanings: xc = center, A = amplitude, p_l = power, p_u = power

Initial Values: xc = 0.0 (vary), A = 1.0 (vary), p_l = 2.0 (vary), p_u = 2.0 (vary)

Lower Bounds: A > 0.0, p_l > 0.0, p_u > 0.0

Upper Bounds: none

Script Access

power2(x,xc,A,pl,pu)

Function File

FITFUNC\POWER2.FDF

10. Rational Functions

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BET

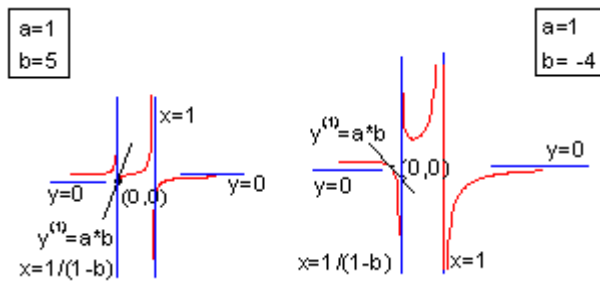
Function

$$y = \frac{abx}{1 + (b-2)x - (b-1)x^2}$$

Brief Description

BET model.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = coefficient

Initial Values: a = 1.0 (vary), b = 5.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

bet(x,a,b)

Function File

FITFUNC\BET.FDF

BETMod

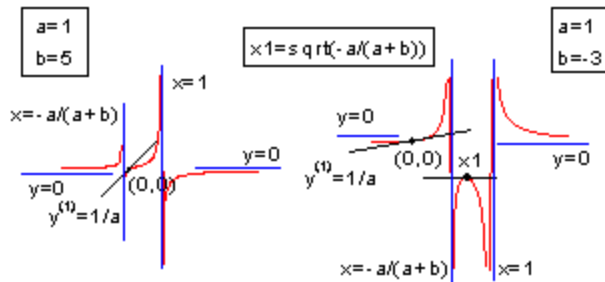
Function

$$y = \frac{x}{a + bx - (a + b)x^2}$$

Brief Description

Modified BET model.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = coefficient

Initial Values: a = 1.0 (vary), b = 5.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

betmod(x,a,b)

Function File

FITFUNC\BETMOD.FDF

Holliday

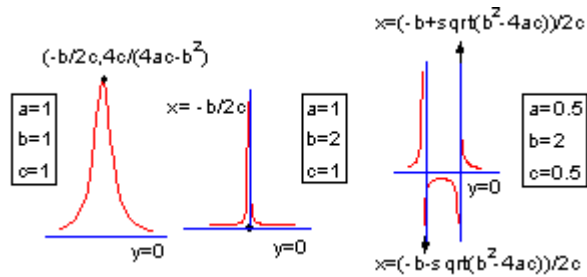
Function

$$y = (a + bx + cx^2)^{-1}$$

Brief Description

Holliday model - a Yield-density model for use in agriculture.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

holliday(x,a,b,c)

Function File

FITFUNC\HOLLIDAY.FDF

Holliday1

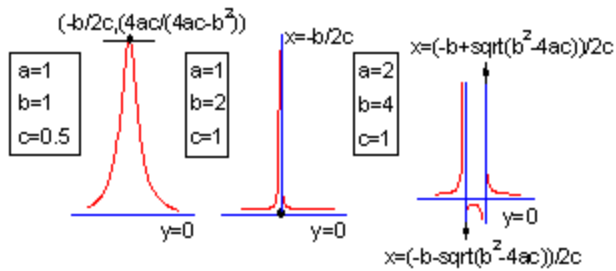
Function

$$y = \frac{a}{a + bx + cx^2}$$

Brief Description

Extended Holliday model.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

holliday1(x,a,b,c)

Function File

FITFUNC\HOLLIDY1.FDF

Nelder

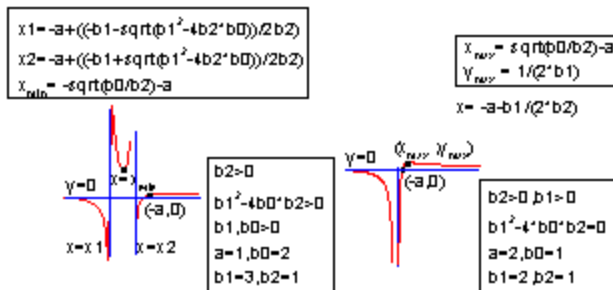
Function

$$y = \frac{x + a}{b_0 + b_1(x + a) + b_2(x + a)^2}$$

Brief Description

Nelder model - a Yield-fertilizer model in agriculture.

Sample Curve



Parameters

Number: 4

Names: a, b0, b1, b2

Meanings: a = unknown, b0 = unknown, b1 = unknown, b2 = unknown

Initial Values: a = 1.0 (vary), b0 = 1.0 (vary), b1 = 1.0 (vary), b2 = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

nelder(x,a,b0,b1,b2)

Function File

FITFUNC\NELDER.FDF

Rational0

Function

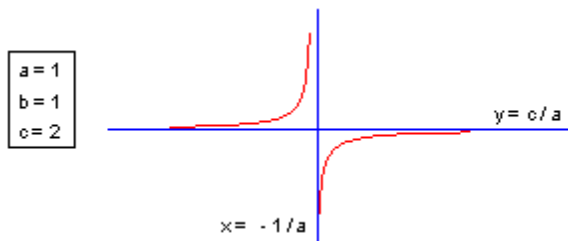
$$y = \frac{b + cx}{1 + ax}$$

Brief Description

Rational function, type 0.

Reference: Ratkowsky, David A. 1990. *Handbook of Nonlinear Regression Models*. Marcel Dekker, Inc. 4.3.24

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

rational0(x,a,b,c)

Function File

FITFUNC\RATION0.FDF

Rational1

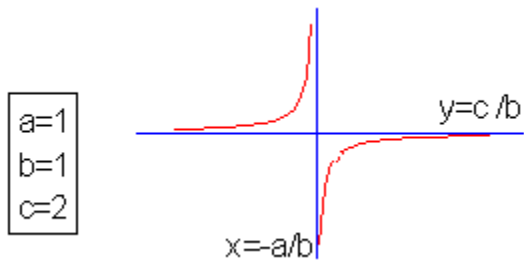
Function

$$y = \frac{1 + cx}{a + bx}$$

Brief Description

Rational function, type 1.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

rational1(x,a,b,c)

Function File

FITFUNC\RATION1.FDF

Rational2

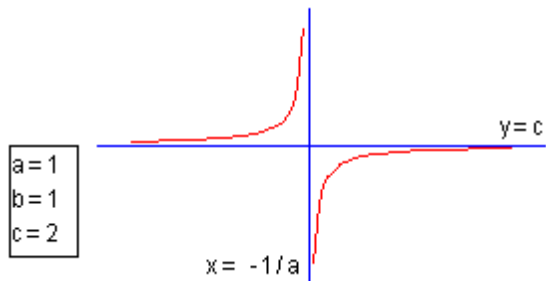
Function

$$y = \frac{b + cx}{a + x}$$

Brief Description

Rational function, type 2.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

rational2(x,a,b,c)

Function File

FITFUNC\RATION2.FDF

Rational3

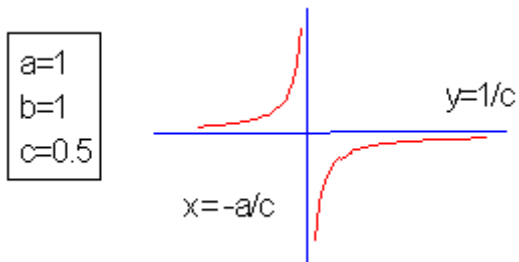
Function

$$y = \frac{b + x}{a + cx}$$

Brief Description

Rational function, type 3.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

rational3(x,a,b,c)

Function File

FITFUNC\RATION3.FDF

Rational4

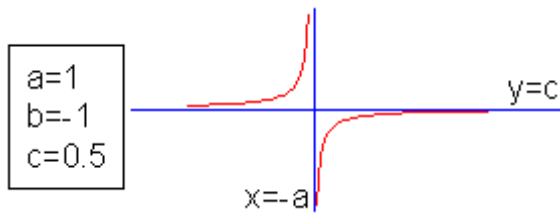
Function

$$y = c + \frac{b}{x + a}$$

Brief Description

Rational function, type 4.

Sample Curve



Parameters

Number: 3

Names: a, b, c

Meanings: a = coefficient, b = coefficient, c = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary), c = 0.5

Lower Bounds: none

Upper Bounds: none

Script Access

rational4(x,a,b,c)

Function File

FITFUNC\RATION4.FDF

Reciprocal

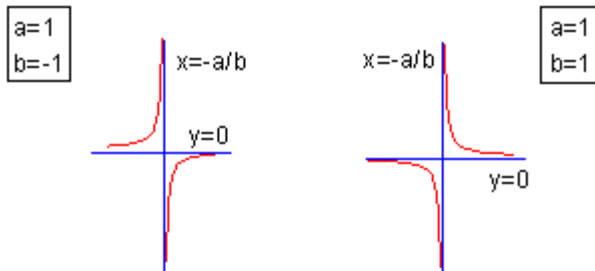
Function

$$y = \frac{1}{a + bx}$$

Brief Description

Two-parameter linear reciprocal function.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

reciprocal(x,a,b)

Function File

FITFUNC\RECIPROC.FDF

Reciprocal0

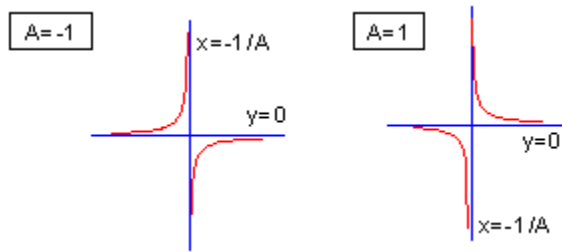
Function

$$y = \frac{1}{1 + Ax}$$

Brief Description

One-parameter linear reciprocal function.

Sample Curve



Parameters

Number: 1

Names: A

Meanings: A = coefficient

Initial Values: A = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

reciprocal0(x,A)

Function File

FITFUNC\RECIPR0.FDF

Reciprocal1

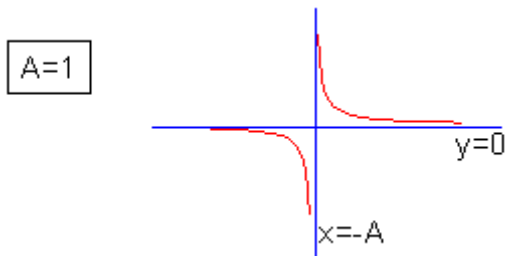
Function

$$y = \frac{1}{x + A}$$

Brief Description

One-parameter linear reciprocal function.

Sample Curve



Parameters

Number: 1

Names: A

Meanings: A = position

Initial Values: A = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

reciprocal1(x,A)

Function File

FITFUNC\RECIPR1.FDF

ReciprocalMod

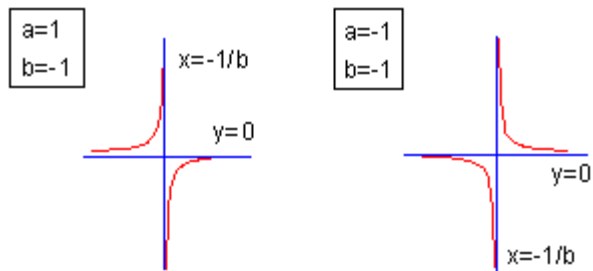
Function

$$y = \frac{a}{1 + bx}$$

Brief Description

Two parameter linear reciprocal function.

Sample Curve



Parameters

Number: 2

Names: a, b

Meanings: a = coefficient, b = coefficient

Initial Values: a = 1.0 (vary), b = 1.0 (vary)

Lower Bounds: none

Upper Bounds: none

Script Access

reciprocalmod(x,a,b)

Function File

FITFUNC\RECIPMOD.FDF

11. Spectroscopy Functions

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GaussAmp

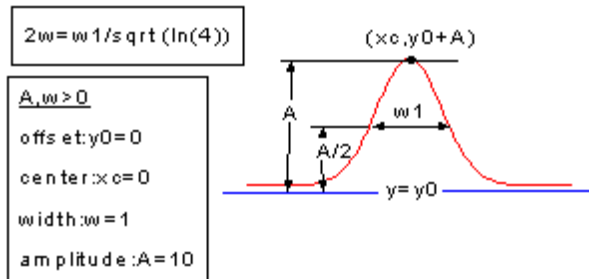
Function

$$y = y_0 + Ae^{-\frac{(x-x_c)^2}{2w^2}}$$

Brief Description

Amplitude version of Gaussian peak function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 10$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

gaussamp(x,y0,xc,w,A)

Function File

FITFUNC\GAUSSAMP.FDF

InvsPoly

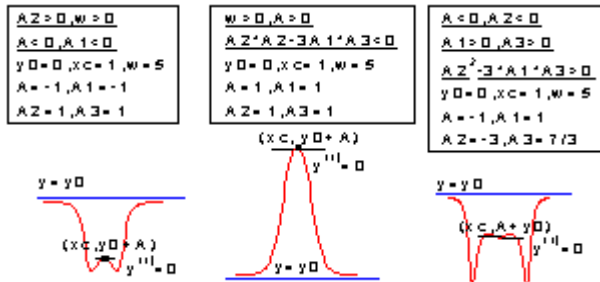
Function

$$y = y_0 + \frac{A}{1 + A_1 \left(2 \frac{x - x_c}{w} \right)^2 + A_2 \left(2 \frac{x - x_c}{w} \right)^4 + A_3 \left(2 \frac{x - x_c}{w} \right)^6}$$

Brief Description

Inverse polynomial peak function with center.

Sample Curve



Parameters

Number: 7

Names: $y_0, x_c, w, A, A_1, A_2, A_3$

Meanings: y_0 = offset, x_c = center, w = width, A = amplitude, A_1 = coefficient, A_2 = coefficient, A_3 = coefficient

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary), $A_1 = 0.0$ (vary), $A_2 = 0.0$ (vary), $A_3 = 0.0$ (vary)

Lower Bounds: $w > 0.0, A_1 \geq 0.0, A_2 \geq 0.0, A_3 \geq 0.0$

Upper Bounds: none

Script Access

invspoly(x,y0,xc,w,A,A1,A2,A3)

Function File

FITFUNC\INVSPOLY.FDF

Lorentz

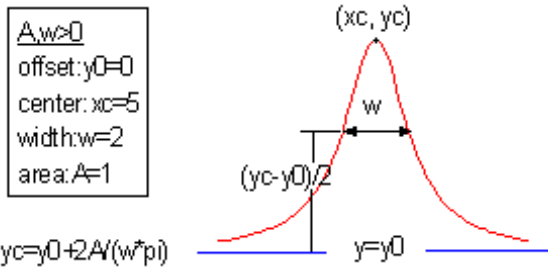
Function

$$y = y_0 + \frac{2A}{\pi} \frac{w}{4(x - x_c)^2 + w^2}$$

Brief Description

Lorentzian peak function.

Sample Curve



Parameters

Number: 4

Names: y_0 , x_c , w , A

Meanings: y_0 = offset, x_c = center, w = width, A = area

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

lorentz(x,y0,xc,w,A)

Function File

FITFUNC\LORENTZ.FDF

PearsonVII

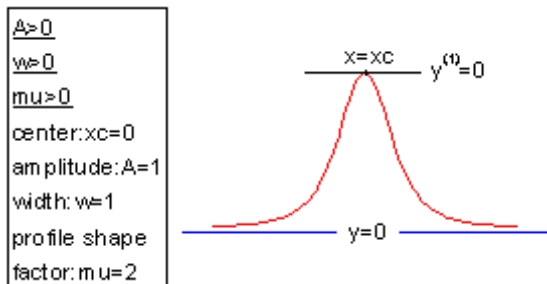
Function

$$y = A \frac{2\sqrt{\mu} e^{\left(\Gamma(2^{1/\mu}-1)\right)}}{\pi e^{\left(\Gamma(\mu-1/2)\right)}} \left[1 + 4 \frac{2^{1/\mu} - 1}{w^2} (x - x_c)^2 \right]^{-\mu}$$

Brief Description

Pearson VII peak function.

Sample Curve



Parameters

Number: 4

Names: x_c , A , w , μ

Meanings: x_c = center, A = amplitude, w = width, μ = profile shape factor

Initial Values: $x_c = 0.0$ (vary), $A = 1.0$ (vary), $w = 1.0$ (vary), $\mu = 1.0$ (vary)

Lower Bounds: $A > 0.0$, $w > 0.0$, $\mu > 0.0$

Upper Bounds: none

Script Access

pearsonvii(x,xc,A,w,mu)

Function File

FITFUNC\PEARSON7.FDF

PsdVoigt1

Function

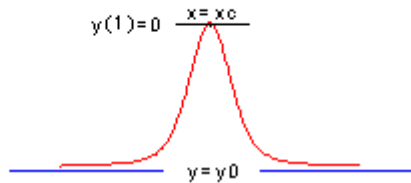
$$y = y_0 + A \left[m_u \frac{2}{\pi} \frac{w}{4(x-x_c)^2 + w^2} + (1 - m_u) \frac{\sqrt{4 \ln 2}}{\sqrt{\pi} w} e^{-\frac{4 \ln 2}{w^2}(x-x_c)^2} \right]$$

Brief Description

Pseudo-Voigt peak function type 1.

Sample Curve

```
A > 0
w > 0
mu > 0
offset:y0=0
center:xc=0
amplitude:A=1
width:w=1
profile shape
factor:mu=0.5
```



Parameters

Number: 5

Names: y0, xc, A, w, mu

Meanings: y0 = offset, xc = center, A = amplitude, w = width, mu = profile shape factor

Initial Values: y0 = 0.0 (vary), xc = 0.0 (vary), A = 1.0 (vary), w = 1.0 (vary), mu = 0.5 (vary)

Lower Bounds: w > 0.0

Upper Bounds: none

Script Access

psdvoigt1(x,y0,xc,A,w,mu)

Function File

FITFUNC\PSDVGT1.FDF

PsdVoigt2

Function

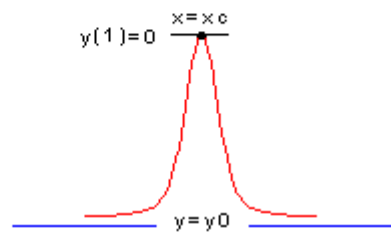
$$y = y_0 + A \left[m_u \frac{2}{\pi} \frac{w_L}{4(x - x_c)^2 + w_L^2} + (1 - m_u) \frac{\sqrt{4 \ln 2}}{\sqrt{\pi} w_G} e^{-\frac{4 \ln 2}{w_G^2} (x - x_c)^2} \right]$$

Brief Description

Pseudo-Voigt peak function type 2.

Sample Curve

```
A > 0
wG ,wL > 0
mu > 0
offset:y0=0
center:xc=0
amplitude:A=1
width:wG=1
width:wL=1
profile shape
factor:mu=0.5
```



Parameters

Number: 6

Names: y0, xc, A, wG, wL, mu

Meanings: y0 = offset, xc = center, A = amplitude, wG = width, wL = width, mu = profile shape factor

Initial Values: y0 = 0.0 (vary), xc = 0.0 (vary), A = 1.0 (vary), wG = 1.0 (vary), wL = 1.0 (vary), mu = 0.5 (vary)

Lower Bounds: wG > 0.0, wL > 0.0

Upper Bounds: none

Script Access

psdvoigt2(x,y0,xc,A,wG,wL,mu)

Function File

FITFUNC\PSDVGT2.FDF

Voigt

Function

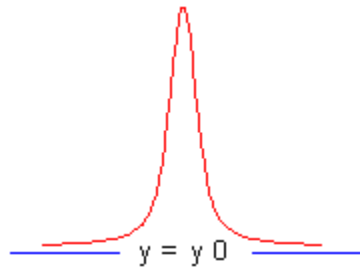
$$y = y_0 + A \cdot \frac{2 \ln 2}{\pi^{3/2}} \frac{w_L}{w_G^2} \cdot \int_{-\infty}^{\infty} \frac{e^{-t^2}}{\left(\sqrt{\ln 2} \frac{w_L}{w_G} \right)^2 + \left(\sqrt{4 \ln 2} \frac{x - x_c}{w_G} - t \right)^2} dt$$

Brief Description

Voigt peak function.

Sample Curve

$A > 0$
offset: $y_0=0$
center: $x_c=5$
amplitude: $A=1$
$w_G=1, w_L=1$



Parameters

Number: 5

Names: y_0, x_c, A, w_G, w_L

Meanings: y_0 = offset, x_c = center, A = amplitude, w_G = Gaussian width, w_L = Lorentzian width

Initial Values: $y_0 = 0.0$ (vary), $x_c = 0.0$ (vary), $A = 1.0$ (vary), $w_G = 1.0$ (vary), $w_L = 1.0$ (vary)

Lower Bounds: $w_G > 0.0, w_L > 0.0$

Upper Bounds: none

Script Access

voigt5(x,y0,xc,A,wG,wL)

Function File

FITFUNC\VOIGT5.FDF

12. Waveform Functions

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<i>SineSqr</i>	166

Sine

Function

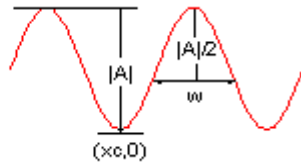
$$y = A \sin\left(\pi \frac{x - x_c}{w}\right)$$

Brief Description

Sine function.

Sample Curve

Center: $x_c=0$
Width: $w=1$
Amplitude: $A=1$



Parameters

Number: 3

Names: x_c , w , A

Meanings: x_c = center, w = width, A = amplitude

Initial Values: $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0$

Upper Bounds: none

Script Access

sine(x,xc,w,A)

Function File

FITFUNC\SINE.FDF

SineDamp

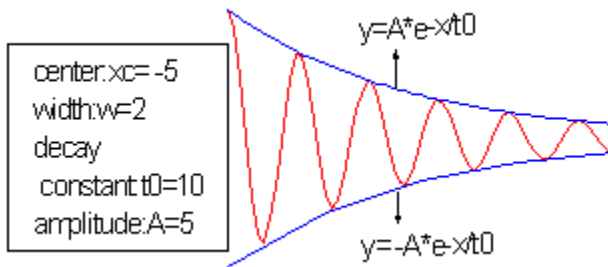
Function

$$y = Ae^{-\frac{x}{t_0}} \sin\left(\pi \frac{x - x_c}{w}\right)$$

Brief Description

Sine damp function.

Sample Curve



Parameters

Number: 4

Names: xc, w, t₀, A

Meanings: xc = center, w = width, t₀ = decay constant, A = amplitude

Initial Values: xc = 0.0 (vary), w = 1.0 (vary), t₀ = 1.0 (vary), A = 1.0 (vary)

Lower Bounds: w > 0.0, t₀ > 0.0

Upper Bounds: none

Script Access

sinedamp(x,xc,w,t₀,A)

Function File

FITFUNC\SINEDAMP.FDF

SineSqr

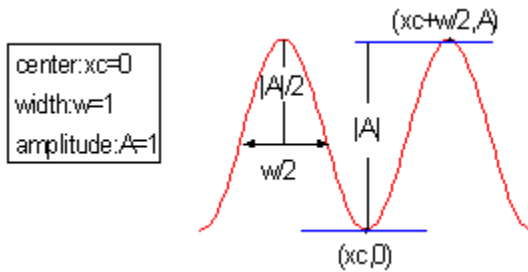
Function

$$y = A \sin^2\left(\pi \frac{x - x_c}{w}\right)$$

Brief Description

Sine square function.

Sample Curve



Parameters

Number: 3

Names: x_c , w , A

Meanings: x_c = center, w = width, A = amplitude

Initial Values: $x_c = 0.0$ (vary), $w = 1.0$ (vary), $A = 1.0$ (vary)

Lower Bounds: $w > 0.0$

Upper Bounds: none

Script Access

sinesqr(x,xc,w,A)

Function File

FITFUNC\SINESQR.FDF