Function List

of

Fitting Function Library App

No.	Function Name	Formula
1	FitConvExp2	$y = y_0 + f(x) * h(x) = y_0 + \frac{A_1}{t_1} e^{\frac{1}{2}\left(\frac{w}{t_1}\right)^2 - \frac{x-xc}{t_1}} \int_{-\infty}^{z_1} \frac{1}{\sqrt{2\pi}} e^{-\frac{\tau^2}{2}} d\tau + \frac{A_2}{t_2} e^{\frac{1}{2}\left(\frac{w}{t_2}\right)^2 - \frac{x-xc}{t_2}} \int_{-\infty}^{z_2} \frac{1}{\sqrt{2\pi}} e^{-\frac{\tau^2}{2}} d\tau$ where $f(x) = \frac{A_1}{t_1} e^{-\frac{x}{t_1}} + \frac{A_2}{t_2} e^{-\frac{x}{t_2}}$, $h(x) = \frac{1}{\sqrt{2\pi} w} e^{-\frac{(x-x_c)^2}{2w^2}}$, $z_1 = \frac{x-xc}{t_1}$ and $z_2 = \frac{x-xc}{t_2}$.
2	Gaussian_LorenProd	$y = y_0 + \frac{A w^2 e^{-\frac{4(1-s)\ln(2)(x-x_c)^2}{w^2}}}{4s(x-x_c)^2 + w^2}$
3	CrossWLF	$y = \frac{\eta_0}{1 + \left(\frac{\eta_0 x}{s}\right)^{1-n}}$ where $\eta_0 = D_1 e^{-\frac{A_1 (T - T_a)}{A_2 + T - T_a}}$.
4	CrossWLFMod	$y = \frac{\eta_0}{1 + \left(\frac{\eta_0 x}{s}\right)^{1-n}}$
5	CrossWLFeta0	$y = D_1 e^{-\frac{A_1 (x - T_a)}{A_2 + x - T_a}}$

No.	Function Name	Formula
6	FitDistExp2	$y = a\int_0^\infty \frac{1}{\sqrt{2\pi}w_1} e^{-\frac{(\tau-x_{c1})^2}{2w_1^2}} \cdot e^{-\frac{x}{\tau}} d\tau + (1-a)\int_0^\infty \frac{1}{\sqrt{2\pi}w_2} e^{-\frac{(\tau-x_{c2})^2}{2w_2^2}} \cdot e^{-\frac{x}{\tau}} d\tau$
7	LogisticMod	$\begin{cases} \frac{dy}{dx} = 0,\ x < x_0 \\ \frac{dy}{dx} = ry\left(1-\frac{y}{y_m}\right),\ x \geq x_0 \end{cases}$
8	NMR1HTitration	$y = \frac{y_0}{2}\left(\left(1+\frac{x}{x_h}+\frac{1}{K_a x_h}\right) - \sqrt{\left(1+\frac{x}{x_h}+\frac{1}{K_a x_h}\right)^2 - \frac{4x}{x_h}}\right)$
9	StretchedExp	$y = y_0 + Ae^{-\left(\frac{x}{t_0}\right)^b}$
10	ArrheniusMod	$y = Ax^n e^{-\frac{E}{Rx}}$

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11	Weibull3Pos	$S=\frac{x-x_c}{w_1}+\left(\frac{w_2-1}{w_2}\right)^{\frac{1}{w_2}}$ $y=\begin{cases} y_0 & S\le 0 \\ y_0+A\left(\frac{w_2-1}{w_2}\right)^{\frac{1-w_2}{w_2}} S^{w_2-1} e^{-S^{w_2}+\left(\frac{w_2-1}{w_2}\right)} & S>0 \end{cases}$
12	HLN	$y=A\left(\psi\left(\frac{1}{2}+\frac{b}{x}\right)-\ln\left(\frac{b}{x}\right)\right)$ where ψ is the digamma function.
13	UpperIncGamma	$y=y_0+c\int_x^{\infty} t^{a-1}e^{-t}dt \quad x\ge 0$
14	HAModel	$y=\frac{1}{1+\left(\frac{1+[Ca]/K_c}{1+[Ca]/K_o}\right)^4\left[\frac{1+e^{ZF(x-V_c)/(RT)}}{1+e^{ZF(x-V_o)/(RT)}}\right]^4 L(0)e^{\frac{-QFx}{RT}}}$
15	LorentzAmp	$y=y_0+\frac{Aw^2}{4(x-x_c)^2+w^2}$

No.	Function Name	Formula
16	DSConv	$f(x)=y_0+(f_1*f_2)(x)=y_0+\frac{H\sqrt{4\ln 2}}{\sqrt{\pi}w_G}\int_{-\infty}^{\infty}\frac{\cos\left(\frac{\pi a}{2}+(1-a)\tan^{-1}\left(\frac{\tau-x_c}{w_D}\right)\right)}{\sqrt{\left(w_D^2+(\tau-x_c)^2\right)^{(1-a)}}}e^{-\frac{4\ln 2(x-\tau)^2}{w_G^2}}d\tau$ where $f_1(x)=\frac{H\cos\left(\frac{\pi a}{2}+(1-a)\tan^{-1}\left(\frac{x-x_c}{w_D}\right)\right)}{\sqrt{\left(w_D^2+(x-x_c)^2\right)^{(1-a)}}}$, $f_2(x)=\frac{H\sqrt{4\ln 2}}{\sqrt{\pi}w_G}e^{-\frac{4\ln 2}{w_G^2}x^2}$
17	ExponentialPDF	$y=\begin{cases} y_0 & y<0 \\ y_0+\frac{A}{\mu}e^{-\frac{x}{\mu}} & y\geq 0 \end{cases}$
18	PWParabola3	$y=\begin{cases} a_1x^2+b_1x+c_1 & x<x_1 \\ a_2x^2+b_2x+c_2 & x_1\leq x\leq x_2 \\ a_3x^2+b_3x+c_3 & x>x_2 \end{cases},$ where c_2 and c_3 are derived parameters.
19	SolarCellsLambertW	$I=I_{\text{ph}}-\frac{V+IR_s}{R_{\text{sh}}}-I_s\left(e^{\frac{V+IR_s}{nV_{\text{th}}}}-1\right)$, where $V_{\text{th}}=\frac{kT}{q}$, k is Boltzmann constant and q is the electron charge. It can be expressed using the Lambert W function. $y=\frac{R_{\text{sh}}\left(I_s+I_{\text{ph}}\right)-x}{R_s+R_{\text{sh}}}-\frac{nV_{\text{th}}}{R_s}\text{LambertW}\left(\frac{R_sR_{\text{sh}}I_s}{nV_{\text{th}}\left(R_s+R_{\text{sh}}\right)}e^{\frac{R_{\text{sh}}\left(R_s\left(I_s+I_{\text{ph}}\right)+x\right)}{nV_{\text{th}}\left(R_s+R_{\text{sh}}\right)}}\right)$
20	PoreSizeDist	$f(r)=\frac{1}{r}e^{-\frac{\left(\ln(r/r_p)\right)^2}{2s_p^2}}$ $y=\frac{\int_x^{\infty}f(r)\left[1-(x/r)^2\right]dr}{\int_0^{\infty}f(r)dr}$

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21	ModDiodeLambertW	$I = I_s\left(e^{\frac{V-IR_s}{nV_{\mathrm{th}}}} - 1\right) + \frac{V - IR_s}{R_{\mathrm{sh}}} - I_{\mathrm{ph}}$, where $V_{\mathrm{th}} = \frac{kT}{q}$, k is Boltzmann constant and q is the electron charge. It can be expressed using the Lambert W function. $I = -\frac{R_{\mathrm{sh}}\left(I_s + I_{\mathrm{ph}}\right) - V}{R_s + R_{\mathrm{sh}}} + \frac{nV_{\mathrm{th}}}{R_s}\mathrm{Lambert}W\left(\frac{R_s R_{\mathrm{sh}} I_s}{nV_{\mathrm{th}}\left(R_s + R_{\mathrm{sh}}\right)} e^{\frac{R_{\mathrm{sh}}\left(R_s\left(I_s + I_{\mathrm{ph}}\right) + V\right)}{nV_{\mathrm{th}}\left(R_s + R_{\mathrm{sh}}\right)}}\right)$