

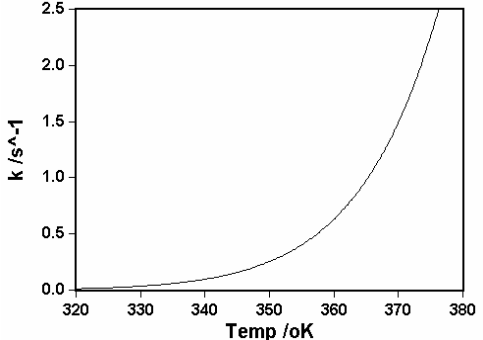
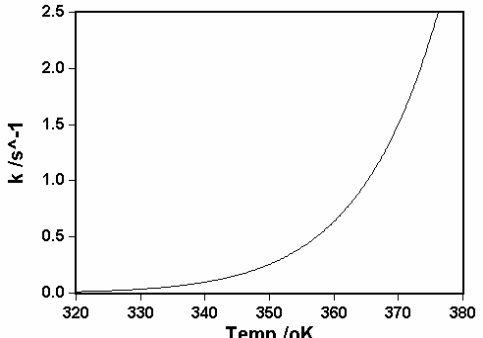
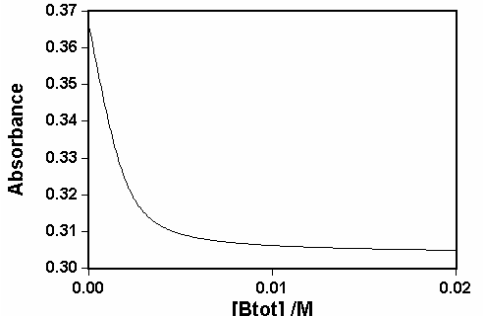
# Chemistry

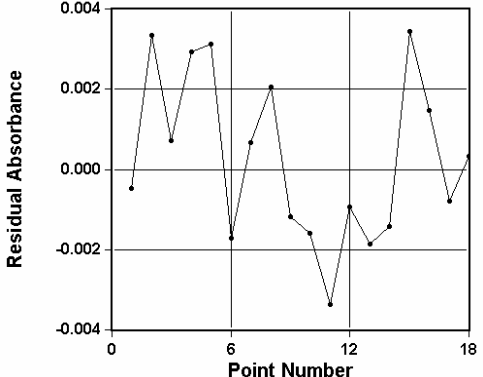
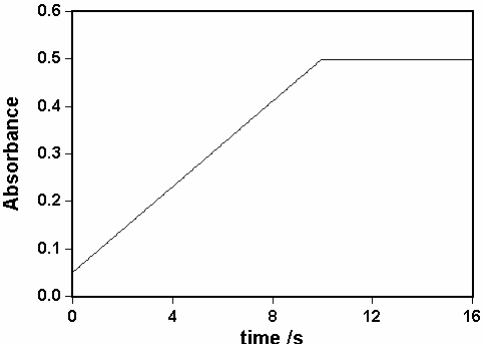
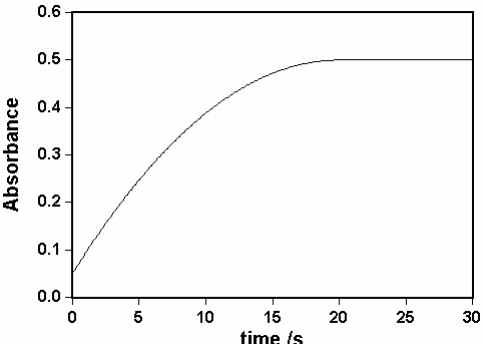
## FitAll Function Library

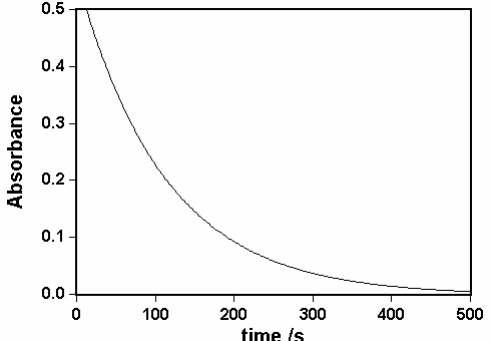
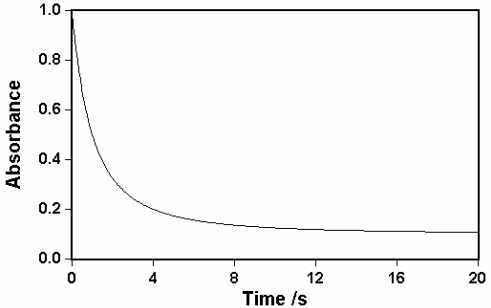
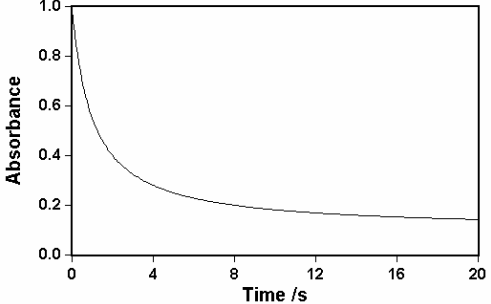
In the function definitions:

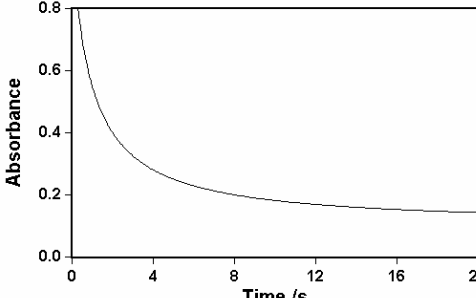
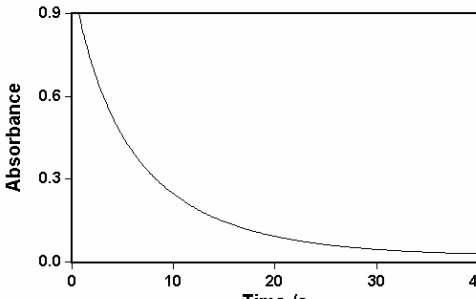
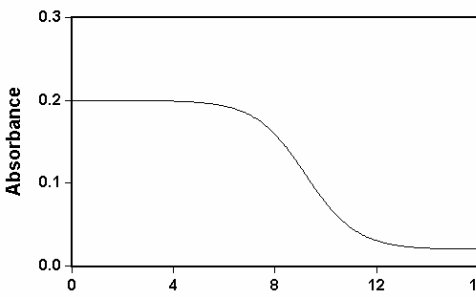
1. Y is the dependent variable.
2. The X's are the independent variables.
3. The K's are constants, the values of which can be changed at runtime.
4. The P's are the parameters that are resolved / determined.

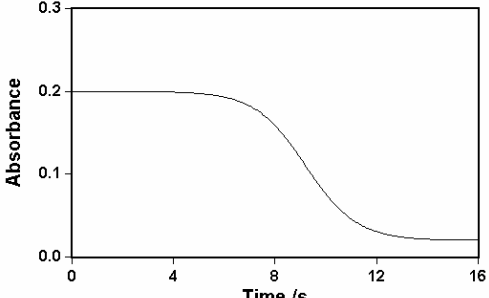
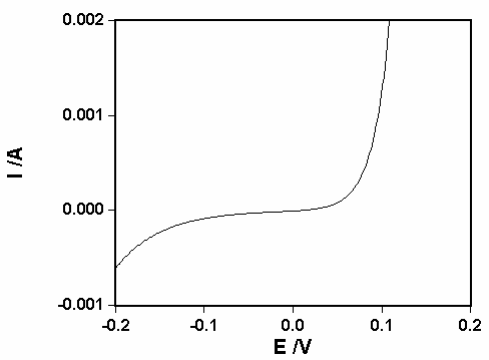
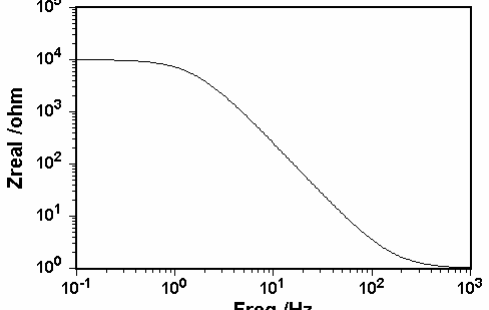
Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Graph
0401	Michaelis-Menton Kinetics  Number of variations: 3	$Y = \frac{P1 * X}{(P2 + X)}$ <p style="text-align: center;">or</p> $Y = \frac{P1 * X}{(P2 + X)} + \frac{P3 * X}{(P4 + X)}$	
0402	Arrhenius Activation Energy  Number of variations: 1	$Y = P1 * e^{\left[ \frac{-P2}{(K1 * X)} \right]}$	

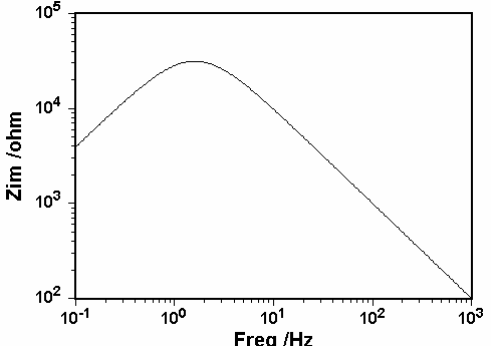
Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Graph
0403	Activation Enthalpy and Entropy  Number of variations: 1	$Y = K1 * X * e^{\left[ \frac{-P1}{(K2 * X)} + \frac{P2}{K2} \right]}$	
0404	Equilibrium Enthalpy and Entropy  Number of variations: 1	$Y = e^{\left[ \frac{-P1}{(K1 * X)} + \frac{P2}{K1} \right]}$	
0405	Reversible Chemical Equilibrium_1: A + B = C, X1 = Btot, K1 = Atot  Number of variations: 3	$Y = P2 * \left\{ \frac{P1 * (K1 + X1) + 1 - \sqrt{\left[ \left( P1 * (K1 + X1) + 1 \right)^2 - 4 * P1^2 * K1 * X1 \right]}}{2 * P1} \right\}$	

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Graph
0406	Reversible Chemical Equilibrium_2: $A + B = C,$ $X1 = B_{tot},$ $X2 = A_{tot}$  Number of variations: 3  Note: This function has two independent variables, X1 and X2.	$Y = P2 * \left\{ \frac{P1 * (X2 + X1) + 1 - \sqrt{[P1 * (X2 + X1) + 1]^2 - 4 * P1^2 * X2 * X1}}{2 * P1} \right\}$	
0407	Chemical Kinetics: Zero-Order Rxn: $A \rightarrow B,$ $-dA/dt = k$  Number of variations: 2	$Y = \begin{cases} P2 * K1, & \text{for } X < 0 \\ P2 * K1 + (P3 - P2) * P1 * X, & \text{for } 0 \leq X \leq \frac{K1}{P1} \\ P3 * K1, & \text{for } X > \frac{K1}{P1} \end{cases}$	
0408	Chemical Kinetics: Half-Order Rxn: $A \rightarrow B,$ $dA/dt = k * A^{(1/2)}$  Number of variations: 2	$Y = \begin{cases} P2 * K1, & \text{for } X < 0 \\ P2 * K1 + (P3 - P2) * P1 * X * \frac{4 * \sqrt{K1} - P1 * X}{4}, & \text{for } 0 \leq X \leq \frac{2 * \sqrt{K1}}{P1} \\ P3 * K1, & \text{for } X > \frac{2 * \sqrt{K1}}{P1} \end{cases}$	

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Graph
0409	Chemical Kinetics: First-Order Rxn: $A \rightarrow B$ , $dA/dt = k \cdot A$  Number of variations: 2	$Y = K1 * [P2 + (P3 - P2) * (1 - e^{-P1 * X})]$ <p style="text-align: center;">or</p> $Y = K1 * P2 * e^{-P1 * X}$	
0410	Chemical Kinetics: (3/2)-Order Rxn: $A \rightarrow B$ , $dA/dt = k \cdot A^{(3/2)}$  Number of variations: 2	$Y = K1 * P2 + (P3 - P2) * K1 * \left( 1 - \frac{4}{(2 + P1 * \sqrt{K1 * X})^2} \right)$	
0411	Chemical Kinetics: Second-Order (equal) Rxn_1: $A \rightarrow B$ , $dA/dt = k \cdot A^2$  Number of variations: 2	$Y = K1 * P2 + \frac{(P3 - P2) * P1 * K1^2 * X}{(1 + P1 * K1 * X)}$	

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Graph
0412	Chemical Kinetics: Second-Order (equal) Rxn_2: $2A \rightarrow B$ , $dA/dt = k \cdot A^2$  Number of variations: 2	$Y = K1 \cdot P2 - \frac{P2 \cdot P1 \cdot K1^2 \cdot X}{(1 + P1 \cdot K1 \cdot X)}$	
0413	Chemical Kinetics: Second-Order (unequal) Rxn: $A + B \rightarrow C$ , $dA/dt = k \cdot A \cdot B$  Number of variations: 2	$Y = K1 \cdot P2 + K2 \cdot P3 - \frac{(P3 + P2) \cdot K1 \cdot K2 \cdot [1 - e^{(K2 - K1) \cdot P1 \cdot X}]}{K1 - K2 \cdot e^{(K2 - K1) \cdot P1 \cdot X}}$	
0414	Chemical Kinetics: Autocatalysis_1: $A \rightarrow B$ , $dA/dt = k \cdot A \cdot B$ , $B_0$ Known  Number of variations: 2	$Y = K1 \cdot P2 - \frac{P2 \cdot K1 \cdot K2 \cdot \left(1 - e^{[(K2 - K1) \cdot P1 \cdot X]}\right)}{K2 + K1 \cdot e^{[(K2 - K1) \cdot P1 \cdot X]}}$	

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Graph
0415	Chemical Kinetics: Autocatalysis_2: A -> B, dA/dt = k*A*B, Bo UnKnown  Number of variations: 2	$Y = K1 * P3 - \frac{P3 * K1 * P2 * \left(1 - e^{[(P2 - K1) * P1 * X]}\right)}{P2 + K1 * e^{[(P2 - K1) * P1 * X]}}$	
0416	Current - Over Potential  Number of variations: 2	$Y = P1 * \left\{ e^{\left[ \frac{K1 * (X - P4)}{P2} \right]} - e^{\left[ \frac{-K1 * (X - P4)}{P3} \right]} \right\}$ <p style="text-align: center;">or</p> $Y = P1 * \left\{ e^{\left[ \frac{K1 * (X - P4 - Y * P5)}{P2} \right]} - e^{\left[ \frac{-K1 * (X - P4 - Y * P5)}{P3} \right]} \right\}$	
0417	Real Impedance of a Parallel RC+Rs Circuit  Number of variations: 2	$Y = \frac{P1}{\left[1 + (2 * \pi * P1 * P2 * X)^2\right]}$ <p style="text-align: center;">or</p> $Y = \frac{P1}{\left[1 + (2 * \pi * P1 * P2 * X)^2\right]} + P3$	

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Graph
0418	Imaginary Impedance of a Parallel RC or RC+Rs Circuit  Number of variations: 1	$Y = \frac{-(2 * \pi * P1)^2 * P2 * X}{1 + (2 * \pi * P1 * P2 * X)^2}$	
0419	Real and Imaginary Impedance of a Parallel RC+Rs Circuit  Number of variations: 2  Note: This function has two independent variables, X1 and X2.	$Y = \begin{cases} \frac{P1}{1 + (2 * \pi * P1 * P2 * X1)^2} + P3, & \text{for } X2 = 0 \\ \frac{-(2 * \pi * P1)^2 * P2 * X1}{1 + (2 * \pi * P1 * P2 * X1)^2}, & \text{for } X2 \neq 0 \end{cases}$	