BiPhasicS model equation is:

$$\log_{10}(N_t) = log_{10}(N_0) + log_{10}((A + B) \times C)$$

where

$$A = f \times D$$

$$B = (1 - f) \times exp(-k_{max2} \times t)$$

$$C = E/(1 + (E - 1) \times D)$$

with

$$D = exp(-k_{max1} \times t)$$

$$E = exp(-k_{max1} \times S1)$$

t is time, log_{10} is base 10 logarithm. The parameters to estimate are f, k_{max1}, k_{max2}, $S1$ and $log_{10}(N_0)$.
The noisy output is defined as:

$$\log_{10}(N_t) = \mathcal{N}(\log_{10}(N_t), \%noise)$$

i.e random number from the normal distribution with mean parameter $\log_{10}(N_t)$ and standard deviation parameter $\%noise$.

Example of BiPhasicS curve
Time unit is mn. Maximal time is 60mn. $f = 0.77$, $k_{max1} = 0.71$, $k_{max2} = 0.71$, $S1 = 12$ and $log_{10}(N_0) = 9.47$