

**Leguerinel model** equation is:

$$\log_{10}(N_t) = K - A^p$$

where

$$A = \frac{t}{\delta \times B}$$

with

$$B = 10^{C^2 + D^2}$$

$$C = \frac{pH - pH_{opt}}{ZpH}$$

$$D = \frac{Aw - Aw_{opt}}{ZAw}$$

$t$  is time,  $\log_{10}$  is base 10 logarithm. The parameters to estimate are  $\delta$  and  $p$ . Five parameters are fixed:  $K$ ,  $pH_{opt}$ ,  $Aw_{opt}$ ,  $ZpH$ ,  $ZAw$ . Two environmental variables are fixed:  $pH$  and  $Aw$ . 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 Leguerinel curve

Time unit is mn. Maximal time is 15mn.  $\delta = 1.8$ ,  $p = 5$ ,  $K = 2$ ,  $pH_{opt} = 6.96$ ,  $Aw_{opt} = 0.985$ ,  $ZpH = 2.18$ ,  $ZAw = 0.092$ ,  $pH = 6.96$  and  $Aw = 0.9$ .

