Regarding

$$\alpha = \alpha_{min} + (\alpha_{max} - \alpha_{min})F(C)$$

where $F(C)$ is a decreasing function of C in $[0, 1]$.

We make the following assumptions:

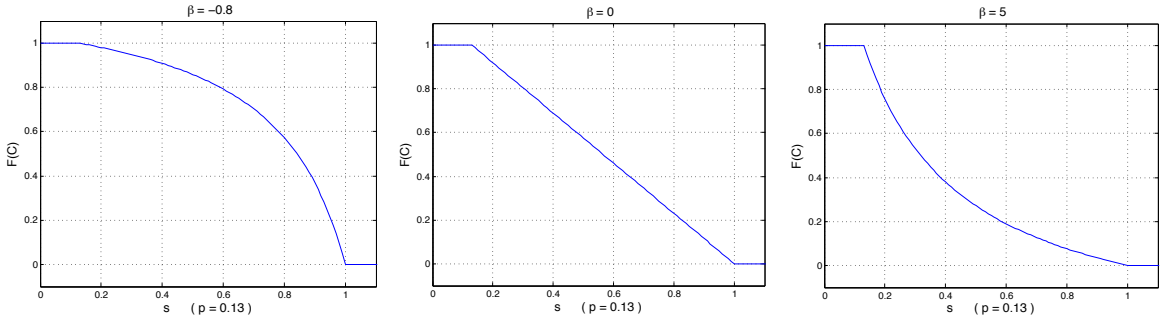
- The mosquitoes sense large concentrations up to some saturation value C_{sat}. Mosquitoes cannot differentiate among concentrations above this value.
- The mosquitoes can sense only concentrations larger than a threshold value $C_{min} = pC_{sat}$ (with $p < 1$).

Based on these assumptions, we want $F(pC_{sat}) = 1$ and $F(C_{sat}) = 0$. We propose the following functional form of $F(C)$ to be

$$F(C) = \begin{cases} 1, & s < p \\ \frac{(1+\beta p)(1-s)}{(1+\beta s)(1-p)}, & p \leq s \leq 1 \\ 0, & 1 < s \end{cases}$$

where $s = C/C_{sat}$ and β is a parameter satisfying $-1 < \beta < \infty$. This parameter can be chosen according to what concavity we want the function to have.

Examples:



In case you were wondering, the *image* of a concave up curve with a given β can be fond by choosing the image value $\beta_2 = -\beta/(1 + (1 + p)\beta)$.