

$$E_i(\mathbf{S}) = \alpha_{i,0} + \sum_{j=1}^{N_S} \alpha_{i,j} \frac{[S_j]}{[S_j] + K_{i,j}} + \sum_{j=1}^{N_S-1} \sum_{j'=j+1}^{N_S} \alpha_{i,j,j'} \frac{[S_j][S_{j'}]}{([S_j] + K_{Q_{i,j,j'}})([S_{j'}] + K_{Q_{i,j',j}})} \quad (1)$$

Basal (constitutive) expression

First order contribution of each signal j ,
where j is 3-oxo-C₁₂-HSL, C₄-HSL ($N_S = 2$)

Second order interaction effect

Every pair-wise combination of signals, j and j' ,
for 3-oxo-C₁₂-HSL and C₄-HSL ($N_S = 2$)

Expression level for gene i , where i is *lasI*, *rhII*, and *lasB*, as a function of all signal concentrations \mathbf{S}