$n := 4$

Number of monomers in an aggregate

$k := 40000000$

Equilibrium constant of aggregate

$s := 0.000005$

Cooperativity Factor

$i := 1 .. 11$

number of experimental points

$$y_i := \begin{bmatrix} 1.5 \cdot 10^{-5} \\ 2.5 \cdot 10^{-5} \\ 5.11 \cdot 10^{-5} \\ 6.38 \cdot 10^{-5} \\ 7.66 \cdot 10^{-5} \\ 8.17 \cdot 10^{-5} \\ 8.94 \cdot 10^{-5} \\ 1.02 \cdot 10^{-4} \\ 1.36 \cdot 10^{-4} \\ 1.7 \cdot 10^{-4} \\ 2.55 \cdot 10^{-4} \end{bmatrix}$$

Experimentally known total concentrations

$$actualalpha := \begin{bmatrix} 1 \\ 0.948 \\ 0.816 \\ 0.622 \\ 0.501 \\ 0.405 \\ 0.339 \\ 0.268 \\ 0.195 \\ 0.156 \\ 0.094 \end{bmatrix}$$

Experimenally obtained ratio of monomer concentration over total concentration

$$\left(\frac{\left(a_i \cdot y_i \cdot k - 1\right)^2}{s \cdot \left(n \cdot \left(a_i \cdot y_i \cdot k - 1\right) - 1\right) \cdot \left(a_i \cdot k \cdot y_i\right)^n - (s-1) \cdot \left(a_i \cdot y_i \cdot k - 2\right) \cdot \left(a_i \cdot y_i \cdot k\right) + 1} \right) - a_i = 0$$

a is alpha which is the ratio of monomer over total concentration. y is the total concentration.

$find\left(a_1\right) = ?$