```
final simplex: (array([[6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                5.66927212e+03, 1.50521324e+04, 9.67394127e-04, 1.43662483e+00,
                                                                                                                6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
                                                                                                                6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                              [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 5.66927212e+03, 1.50521324e+04, 9.67394123e-04, 1.43662483e+00,
                                                                                                                6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
                                                                                                                6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                               5.66927212e+03, 1.50521324e+04, 9.67394123e-04, 1.43662483e+00,
                                                                                                                6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
                                                                                                               6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                               [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                5.66927212e+03, 1.50521324e+04, 9.67394125e-04, 1.43662483e+00,
                                                                                                               \begin{array}{l} 6.83835638e+02,\ 3.24643802e+04,\ 4.73376905e-04,\ 7.03926960e+00,\\ 6.32148081e-01,\ 9.72768210e-01,\ 2.64017386e+00,\ 1.91933916e+00], \end{array}
                                                                                                              [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                5.66927212e+03, 1.50521324e+04, 9.67394124e-04, 1.43662483e+00,
                                                                                                                6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
                                                                                                                6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                               [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                5.66927212e+03, 1.50521324e+04, 9.67394124e-04, 1.43662483e+00,
                                                                                                                6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
                                                                                                                6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                               [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                5.66927212e+03, 1.50521324e+04, 9.67394124e-04, 1.43662483e+00,
       ['SM data type data plots for mutation', 'Regulator68]e+02, 3.24643802e+04, 7.03926960e+00, 1.91933916e+00], ucer -> sensor (GFP output) inducer -> S[6] 18647688 24821 6278856 624 Converged 79e+03, 1.09654125e+00,
inducer -> sensor (GFP output)
                                                                                                                5.66927212e+03, 1.50521324e+04Converged21e-04, 1.43662483e+00,
                                                                                                              6.83835638e+02, 3.2464380 e+0 4 Converged 5e-04, 7.03926960e+00, 6.32148081e-01, 9.72768210 e-01, Converged 79e+03, 1.09654125e+00, [6.18047086e+02, 1.6278856 e+0 Converged 79e+03, 1.09654125e+00,
                                                                           10^{4}
                                                                                                                5.66927212e+03, 1.$0521324e+04, 9.67394124e-04, 1.43662483e+00,
                                                                                                                6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00, 6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                     6 \times 10^{3}
                                                                                                               [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                    4 \times 10^{3}
                                                                                                                5.66927212e+03, 1.$0521324e+04, 9.67394122e-04, 1.43662483e+00,
                                                                    3 \times 10^{3}
                                                                                                                6.83835638e+02, 3.‡4643802e+04, 4.73376905e-04, 7.03926960e+00,
                                                                                                                6.<del>32148081e-01, 9.</del>72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                               [6<u>]18047086e+02, 1.6</u>2788566e+04, 1.30065379e+03, 1.09654125e+00, 5.66927212e+03, 1.50521324e+04, 9.67394124e-04, 1.43662483e+00,
                                          10-2
                                                                                10<sup>-5</sup>
                           10-3
                                                         10^{-1}
                                                                                               10^{-4}
                                                                                             Full circum 8 8 9 5 6 6 6 6 6 7 . 3.24643802e+04, 4.73376905e-04, 7.03926960e+00, 6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
   inducer -> S -| Output (GFP)
                                                                    6 \times 10^{3}
                                                                                                              [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                            • 5.66927212e+03, 1.$0521324e+04, 9.67394124e-04, 1.43662483e+00,
                                                                                                                &83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
                                                                                                                6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                    4 \times 10^{3}
                                                                                                               [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,

5.66927212e 103, 1.50521324e+04, 9.67394122e-04, 1.43662483e+00,
                                                                                                                6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                    3 \times 10^{3}
                                                                                                              [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 5.66927212e+03, 1.50521324e+04, 9.67394124e-04, 1.43662483e+00,
                                                                                                              \begin{array}{l} 6.83835638e \pm 0.7, 3.24643802e \pm 0.4, 4.73376905e \pm 0.4, 7.03926960e \pm 0.6, \\ 6.83835638e \pm 0.7, 3.24643802e \pm 0.4, 4.73376905e \pm 0.4, 7.03926960e \pm 0.6, \\ 6.32148981e \pm 0.1, 19, 72.768210e \pm 0.1, 2.64017386e \pm 0.0, 1.91933916e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.4, 1.30065379e \pm 0.3, 1.09654125e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.62788566e \pm 0.0, 1.096546e \pm 0.0, 1.096546e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.096546e \pm 0.0, 1.096546e \pm 0.0, 1.096546e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.096546e \pm 0.0, 1.096546e \pm 0.0, 1.096546e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.09656e \pm 0.0, 1.096546e \pm 0.0, 1.09656e \pm 0.0, \\ [6.18047086e \pm 0.2, 1.09656e \pm 0.0, 1.09656e \pm 0.0, 1.09656e \pm 0.0, \\ [6.18047086e \pm 0.0, 1.09666e \pm 0.0, 1.09666e \pm 0.0, 1.09666e \pm 0.0, \\ [6.18047086e \pm 0.0, 1.09666e \pm 0.0, 1.09666e \pm 0.0, 1.09666e \pm 0.0, \\ [6.18047086e \pm 0.0, 1.09666e \pm 0.0, 1.09666e \pm 0.0, 1.09666e \pm 0.0, \\ [6.18047086e \pm 0.00666e \pm 0.00666e \pm 0.00666e \pm 0.0, \\ [6.18047086e \pm 0.00666e \pm 0.00666e \pm 0.00666e \pm 0.00666e \pm 0.00666e \pm
                                                                                 10^{-5}
                                          10^{-2}
                                                          10^{-1}
                           10^{-3}
                                                                                               10^{-4}
         Across all four plots:
                                                                                                                5.66927212e+03, 1.50521324e+04, 9.67394121e-04, 1.43662484e+00,
                                                                                                                6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
            RSS (converged)=0.159
                                                                                                                6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                               [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
            RSS (initial)=3.419
                                                                                                                5.66927212e+03, 1.50521324e+04, 9.67394124e-04, 1.43662483e+00,
                                                                                                                6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
            RSS (% reduction)=0.956
                                                                                                                6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                               [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                      epsilon Initial guesses
                                                                   Converged
                                                                                                                5.66927212e+03, 1.50521324e+04, 9.67394124e-04, 1.43662483e+00,
                   0.000000
                                           618.047086 618.047086
                                                                                                                6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
                   0.000000
                                         16278.856600 16278.856600
                                                                                                                6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00]), array([0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.1587454, 0.1587454, 0.1587454, 0.1587454, 0.1587454, 0.158744, 0.158744, 0.158744, 0.158744, 0.158744, 0.158744, 0.158744, 0.
                                          1300.653790 1300.653790
                   0.000000
                                                                                                               0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254,
                   0.000000
                                              1.096541
                                                                   1.096541
                                                                                                               0.15873254, 0.15873254, 0.15873254, 0.15873254, 0.15873254,
        A r 3753.096513
                                             1916.175610 5669.272123
                                                                                                              0.15873254, 0.15873254]))
                                            18874.240800 15052.132420
        B r -3822.108380
                                                                                                                   fun: 0.15873254068697146
                                             0.009030
                  -0.008063
                                                                    0.000967
                                                                                                               message: 'Optimization terminated successfully.'
                                             0.820433
                   0.616191
                                                                    1.436625
                                                                                                                 nfev: 2354
                   0.000000
                                            683.835638
                                                                   683.835638
                                                                                                                  nit: 1579
                                          32464.380200 32464.380200
                    0.000000
                                                                                                                status: 0
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                    0.000000
                                                                     0.000473
                                                                                                               success: True
                   4.217918
                                              2.821352
                                                                     7.039270
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                                                                     0.632148
                                                                                                               5.66927212e+03, 1.50521324e+04, 9.67394127e-04, 1.43662483e+00,
                   0.000000
                                              0.972768
                                                                     0.972768
                                                                                                               6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 7.03926960e+00,
                    0.000000
                                              2.640174
                                                                      2.640174
                                                                                                               6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00])
```

 10^{4}

 10^{3}

 10^{4}

 10^{3}

 10^{-5}

 10^{-4}

 10^{-4}

Bs

C s

 N_s

 C_r

Νr

Αh

Βh

C h

Fο

Αо

Во

Со

0.000000

1.919339

1.919339