```
final simplex: (array([[6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                     4.55135362e+03, 5.24544733e+03, 6.52914641e-04, 2.79461005e+00,
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920953e+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, 4.55135362e+03, 5.24544736e+03, 6.52914647e-04, 2.79461000e+00,
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920952e+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,
                                                                                     4.55135364e+03, 5.24544731e+03, 6.52914645e-04, 2.79461002e+00,
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920952e+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,
                                                                                     4.55135363e+03, 5.24544727e+03, 6.52914640e-04, 2.79461004e+00,
                                                                                    \begin{array}{l} 6.83835638e+02,\ 3.24643802e+04,\ 4.73376905e-04,\ 5.83920954e+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, 1.09654125e+00]
                                                                                     4.55135364e+03, 5.24544740e+03, 6.52914656e-04, 2.79461002e+00,
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920953e+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,
                                                                                     4.55135364e+03, 5.24544741e+03, 6.52914656e-04, 2.79460999e+00,
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920953e+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,
                                                                                     4.55135363e+03, 5.24544729e+03, 6.52914639e-04, 2.79461008e+00,
     ['SM data type data plots for mutation', 'Regulator58e+02, 3.24643802e+03 Initial Guess e-04, 5.83920953e+00, ucer -> sensor (GFP output) inducer -> S[6] 1864 7688 248081e-01, 9,72768210e-01, 2,72768210e-01, 2,72768210e-01
inducer -> sensor (GFP output)
                                                         10^{4}
                                                                                     4.55135363e+03, 5.2454472 6.2+0 Converged 38e-04, 2.79461006e+00,
                                                                                    6.83835638e+02, 3.2464380 e+0 Converged 5e-04, 5.83920951e+00, 6.32148081e-01, 9.72768210 e-01, Converged 79e+03, 1.09654125e+00, [6.18047086e+02, 1.6278856
                                                    6 \times 10^{3}
                                                                                       .55135363e+03, 5.24544734e+03, 6.52914645e-04, 2.79461006e+00,
                                                                                    6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920952e+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,
                                                    3 \times 10^{3}
                                                                                     4.55135364e+03, 5.24544731e+03, 6.52914655e-04, 2.79461008e+00,
                                                                                     6.83835638e+02, 3.‡4643802e+04, 4.73376905e-04, 5.83920952e+00,
                                                                                     6.32<del>148081e-01, 9.</del>72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                    [6<u>18</u>04708<u>6</u><u>e</u>+02<u>1</u>62788566e+04, 1.30065379e+03, 1.09654125e+00, 4055135384e+03, 5.24544738e+03, 6.52914655e-04, 2.79460998e+00,
                                                             10<sup>-5</sup>
                     10-3
         10^{-4}
                                10^{-2}
                                                                        10^{-4}
                                                                       Full circuft 8 7 5 6 7 6 6 2 7 6 7 7 2 7 6 8 2 10 e - 01, 2.64017386 e + 00, 1.91933916 e + 00],
  inducer -> S -| Output (GFP)
                                                                                    [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                     4.55135362e+03, 5.24544738e+03, 6.52914649e-04, 2.79460990e+00,
                                                    6 \times 10^3
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920952e+00,
                                                                                       32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                    [6.N047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                    4 \times 10^{3}
                                                                                     4.55135364e+03, 5.24544724e+03, 6.52914634e-04, 2.79461009e+00,
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920953e+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,
                                                                                     4.55135363e+03, 5.24544736e+03, 6.52914650e-04, 2.79461000e+00,
                                                                                    \begin{array}{l} 6.83835638e \pm 0.7, 3.24643802e + 04, 4.73376905e - 04, 5.83920953e + 00, \\ 6032148981e - 01, 19, 72768210e - 01, 2.64017386e + 00, 1.91933916e + 00], \\ [6.18047086e + 02, 1.62788566e + 04, 1.30065379e + 03, 1.09654125e + 00, \\ \end{array}
                                                             10^{-5}
                                10^{-2}
                                            10^{-1}
                     10^{-3}
                                                                        10^{-4}
       Across all four plots:
                                                                                     4.55135363e+03, 5.24544729e+03, 6.52914642e-04, 2.79461010e+00,
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920952e+00,
         RSS (converged)=0.12
                                                                                     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)=1.734
                                                                                     4.55135363e+03, 5.24544731e+03, 6.52914652e-04, 2.79461004e+00,
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920952e+00,
         RSS (% reduction)=0.935
                                                                                     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
                                                                                     4.55135363e+03, 5.24544740e+03, 6.52914659e-04, 2.79460995e+00,
               0.000000
                                 618.047086 618.047086
                                                                                     6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920953e+00,
               0.000000
                                16278.856600 16278.856600
                                                                                    0.000000
                                 1300.653790 1300.653790
                                                                                    0.12000795, 0.12000795, 0.12000795, 0.12000795, 0.12000795,
               0.000000
                                   1.096541
                                                   1.096541
                                                                                    0.12000795, 0.12000795, 0.12000795, 0.12000795, 0.12000795,
                                   1916.175610 4551.353623
            2635.178013
                                                                                    0.12000795, 0.12000795]))
                                   18874.240800 5245.447329
      B r -13628.793471
                                                                                       fun: 0.12000794809054156
               -0.008377
                                   0.009030
                                                     0.000653
                                                                                    message: 'Optimization terminated successfully.'
                                   0.820433
               1.974177
                                                     2.794610
                                                                                      nfev: 2131
                0.000000
                                  683.835638
                                                    683.835638
                                                                                       nit: 1457
                                32464.380200 32464.380200
                0.000000
                                                                                     status: 0
                                    0.000473
                0.000000
                                                     0.000473
                3.017858
                                   2.821352
                                                     5.839210
                                                                                         x: array([6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                   0.632148
                0.000000
                                                     0.632148
                                                                                    4.55135362e+03, 5.24544733e+03, 6.52914641e-04, 2.79461005e+00,
                0.000000
                                   0.972768
                                                     0.972768
                                                                                    6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 5.83920953e+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}

Вs

C s

 N_s

Сr

Νr

Αh

Βh

Ch

Fο

Во

Со

0.000000

1.919339

1.919339