```
final simplex: (array([[6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                                                                                                           7.22103038e+03, 2.69786132e+04, 8.78507158e-04, 1.74084237e+00,
                                                                                                           8.29194962e+01, 5.31098676e+04, 9.91706550e-04, 1.10512775e-01,
                                                                                                           3.73450802e+00, 1.32969919e+00, 1.35615364e+00]
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                                                                                                           7.22103038e+03, 2.69786132e+04, 8.78507157e-04, 1.74084238e+00,
                                                                                                           8.29194962e+01, 5.31098676e+04, 9.91706551e-04, 1.10512775e-01,
                                                                                                           3.73450802e+00, 1.32969919e+00, 1.35615364e+00],
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423008e+03, 1.13114588e+00,
                                                                                                           7.22103038e+03, 2.69786132e+04, 8.78507158e-04, 1.74084237e+00,
                                                                                                           8.29194962e+01, 5.31098676e+04, 9.91706550e-04, 1.10512775e-01,
                                                                                                           3.73450802e+00, 1.32969919e+00, 1.35615364e+00]
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                                                                                                           7.22103038e+03, 2.69786132e+04, 8.78507159e-04, 1.74084237e+00,
                                                                                                           8.29194962e+01, 5.31098676e+04, 9.91706550e-04, 1.10512775e-01,
                                                                                                           3.73450802e+00, 1.32969920e+00, 1.35615364e+00],
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                                                                                                           7.22103038e+03, 2.69786132e+04, 8.78507158e-04, 1.74084237e+00,
                                                                                                           8.29194962e+01, 5.31098676e+04, 9.91706550e-04, 1.10512775e-01,
                                                                                                           3.73450802e+00, 1.32969919e+00, 1.35615364e+00],
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
      ['SM data type data plots for mutation', 'Regulation' \frac{1}{2} = +03, 2.6978613 = +04 Initial Guess 0e-04, 1.74084237e+00, ucer -> sensor (GFP output) inducer -> \frac{8}{3} | \frac{2}{7} | \frac{1}{7} 
inducer -> sensor (GFP output)
                                                                                                         10^{4}
                                                                                                           [6_45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                                                                                                           7.22103038e+03, 2.69786132e+04, 8.78507159e-04, 1.74084237e+00, 8.29194962e+01, 5.31098675e+04, 9.91706549e-04, 1.10512775e-01,
                                                                                                           3.73450802e+00, 1.32969919e+00, 1.35615364e+00],
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                                                                                                            7.22103038e+03, 2.69786132e+04, 8.78507159e-04, 1.74084237e+00,
                                                                                                           8.2<del>9194962e+01, 5</del>.$1098676e+04, 9.91706549e-04, 1.10512775e-01,
                                                                                                          <del>'3"73450802e+00"1.</del>32969919e+00, 1.35615364e+00],
[<del>6</del>.45835<del>7</del>95e+02<sup>1</sup>, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                                         10^{-2}
                                                       10^{-1}
                                                                             10^{-5}
                                                                                            10^{-4}
                                                                                          Full circu/t20103638603, 2.69786132e+04, 8.78507156e-04, 1.74084238e+00,
   inducer -> S -| Output (GFP)
                                                                                                               <del>29194962e+01, 5.</del>31098676e+04, 9.91706549e-04, 1.10512775e-01,
                                                                                                           3.73450802e+00, 1.$2969919e+00, 1.35615364e+00],
                                                                                                           (6.45835775e+02, 1.63359814e+04, 1.24423008e+03, 1.13114588e+00,
                                                                 4 \times 10^{3}
                                                                                                                22103038e+03, 2.69786132e+04, 8.78507159e-04, 1.74084237e+00,
                                                                                                                   194962e+01, 5.$1098676e+04, 9.91706550e-04, 1.10512775e-01,
                                                                 3 \times 10^{3}
                                                                                                           [6.45835775e+02, 1.63359814e+04, 1.24423008e+03, 1.13114588e+00,
                                                                                                           7.221030<del>37e+03, 2</del>.69786133e+04, 8.78507160e-04, 1.74084237e+00,
                                                                 2 \times 10^{3}
                                                                                                           8.29194962e+01, 5.31098676e+04, 9.91706551e-04, 1.10512775e-01,
                                                                                                           3.73450802e+00, 1.$2969920e+00, 1.35615364e+00],
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                                                                                                            7<u>,22103038e+03, 2.</u>69786132e+04, 8.78507160e-04, 1.74084237e+00,
                                                                                                           \beta_029194962e+01<sub>1</sub>6-31098676e+04, 9.91706550e-04, 1.10512775e-01, 3.73450802e+00, 1.32969920e+00, 1.35615364e+00],
                                                                             10^{-5}
                                        10^{-2}
                                                                                           10^{-4}
                                                       10^{-1}
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
         Across all four plots:
                                                                                                           7.22103038e+03, 2.69786132e+04, 8.78507158e-04, 1.74084237e+00,
                                                                                                           8.29194962e+01, 5.31098676e+04, 9.91706551e-04, 1.10512775e-01,
            RSS (converged)=0.059
                                                                                                           3.73450802e+00, 1.32969919e+00, 1.35615364e+00],
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
            RSS (initial)=5.514
                                                                                                           7.22103037e+03, 2.69786133e+04, 8.78507161e-04, 1.74084237e+00,
                                                                                                           8.29194963e+01, 5.31098676e+04, 9.91706551e-04, 1.10512776e-01,
            RSS (% reduction)=0.989
                                                                                                           3.73450802e+00, 1.32969919e+00, 1.35615364e+00],
                                                                                                          [6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                      epsilon Initial guesses Converged
                                                                                                           7.22103038e+03, 2.69786132e+04, 8.78507159e-04, 1.74084237e+00,
                 37.438672
                                            608.397103 645.835775
                                                                                                           8.29194962e+01, 5.31098676e+04, 9.91706551e-04, 1.10512775e-01,
        B s 1085.523727
                                            15250.457700 16335.981427
                                                                                                           3.73450802e+00, 1.32969919e+00, 1.35615364e+00]]), array([0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.058610
       C_s -423.828964
                                            1668.059050 1244.230086
                                                                                                          0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106, 0.0586106,
                                                                  1.131146
                                             1.198934
                  -0.067788
                                                                                                          0.0586106, 0.0586106, 0.0586106, 0.0586106]))
                                             687.964693 7221.030376
                6533.065683
                                                                                                              fun: 0.05861059789432494
                3481.001814
                                            23497.611400 26978.613214
                                                                                                          message: 'Optimization terminated successfully.'
                                             0.062367
                                                                   0.000879
                                                                                                             nfev: 34917
                                             0.391731
                                                                  1.740842
                                                                                                              nit: 26655
                 -507.687052
                                             590.606548
                                                                    82.919496
                                                                                                           status: 0
                                             35287.125700 53109.867576
        B h 17822.741876
                                                                                                          success: True
                                             0.000530
                                                                   0.000992
                                                                                                                x: array([6.45835775e+02, 1.63359814e+04, 1.24423009e+03, 1.13114588e+00,
                                             0.829830
                                                                   0.110513
                                                                                                          7.22103038e+03, 2.69786132e+04, 8.78507158e-04, 1.74084237e+00,
                                             4.288170
                                                                   3.734508
                                                                                                          8.29194962e+01, 5.31098676e+04, 9.91706550e-04, 1.10512775e-01,
                                                                   1.329699
                                             3.133222
                                                                                                          3.73450802e+00, 1.32969919e+00, 1.35615364e+00
                                             1.809018
                                                                   1.356154
```

 $10^{4}$ 

 $10^{3}$ 

 $10^{4}$ 

 $10^{3}$ 

 $10^{-5}$ 

 $10^{-4}$ 

 $10^{-4}$ 

Cr

Nr

Сh

Νo

 $10^{-3}$ 

 $10^{-3}$ 

-0.061489

1.349111

0.000462

-0.719317

-0.553662

-1.803523

-0.452865