```
final simplex: (array([[6.59699169e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73200698e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
                                                                                                          1.84431986e+01, 8.40904643e+04, 1.91102218e-03, 4.10971588e+01,
                                                                                                          2.03045654e+00, 1.14360541e+00, 1.20775810e+00],
                                                                                                          [6.59699170e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                          3.73200699e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
                                                                                                          1.84431987e+01, 8.40904643e+04, 1.91102219e-03, 4.10971587e+01,
                                                                                                          2.03045654e+00, 1.14360541e+00, 1.20775810e+00],
                                                                                                          [6.59699170e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73200699e+03, 1.79208526e+04, 1.56865470e-03, 1.25886749e+00,
                                                                                                          1.84431987e+01, 8.40904644e+04, 1.91102219e-03, 4.10971587e+01,
                                                                                                          2.03045654e+00, 1.14360541e+00, 1.20775810e+00],
                                                                                                          [6.59699170e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                          3.73200698e+03, 1.79208526e+04, 1.56865471e-03, 1.25886749e+00,
                                                                                                           1.84431986e+01, 8.40904644e+04, 1.91102219e-03, 4.10971588e+01,
                                                                                                          2.03045654e+00, 1.14360541e+00, 1.20775810e+00],
                                                                                                          [6.59699170e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73200699e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
                                                                                                           1.84431987e+01, 8.40904643e+04, 1.91102219e-03, 4.10971587e+01,
                                                                                                           2.03045654e+00, 1.14360541e+00, 1.20775810e+00],
                                                                                                          [6.59699170e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73200699e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
              ['SM data type data plots for mutation', 'Regulator'] + 01, 8.4090464 - 01 Initial Guess - 03, 4.10971587e+01, ucer -> sensor (GFP output) inducer -> - 01 inducer ->
       inducer -> sensor (GFP output)
                                                                                                           3.73200699e+03, 1.7920852 - - 4Converged 70e-03, 1.25886749e+00,
                                                                                                          1.84431986e+01, 8.40904643<u>e+0</u>4Converged 18e-03, 4.10971588e+01,
                                                                         10^{4}
                                                                                                           2.03045654e+00, 1.14360541e+0
                                                                                                                                                                                     .0e+00],
                                                                                                         [6.59699169e+02, 1.6524231 e+0 Converged 60e+03, 1.14127580e+00,
                                                                                                          3.73200699e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
                                                                    6 \times 10^{3}
                                                                                                             84431986e+01, 8.‡0904643e+04, 1.91102219e-03, 4.10971588e+01,
                                                                                                           <mark>2.0304</mark>5654e+00, 1.14360541e+00, 1.20775810e+00],
                                                                    4 \times 10^{3}
                                                                                                          [6.59699170e+02, \bullet.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73200699e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
                                                                    3 \times 10^{3}
                                                                                                             <u>.</u>84431987e+01, 8.40904643e+04, 1.91102219e-03, 4.10971585e+01,
                                                                                                           2.03045655e+00, 1.14360541e+00, 1.20775810e+00],
                                                                                                           \begin{array}{l} 6.59699170e+02.1.65242310e+04, \ 1.19560860e+03, \ 1.14127580e+00, \\ 3.73200698e+03, \ 1.79208525e+04, \ 1.56865470e-03, \ 1.25886749e+00, \end{array}
                  10^{-4}
                               10^{-3}
                                             10^{-2}
                                                           10^{-1}
                                                                               10^{-5}
                                                                                            10^{-4}
                                                                                          Full circult & 4431 & 7; pt 01, 8.40904644e+04, 1.91102219e-03, 4.10971586e+01,
          inducer -> S -| Output (GFP)
                                                                                                                      <del>56556+00, 1.1</del>4360541e+00, 1.20775810e+00],
                                                                    6 \times 10^{3}
                                                                                                          [6.59699169e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73200699e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
                                                                                                           1.84431987e+01, 8.40904643e+04, 1.91102219e-03, 4.10971587e+01,
                                                                                                             .03045654e+00, 1.14360541e+00, 1.20775810e+00],
                                                                    4 \times 10^{3}
                                                                                                           6.59699170e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                              7§200698e+03, 1.†9208525e+04, 1.56865470e-03, 1.25886749e+00,
                                                                                                             $44<mark>3</mark>1986e+01, 8.40904643e+04, 1.91102218e-03, 4.10971589e+01,
                                                                    3 \times 10^{3}
                                                                                                         2.03045654e+00, 1.14360541e+00, 1.20775810e+00], [6.59699470e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73209699e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
                                                                                                            <u>.84431987e+01, 8</u>.40904643e+04, 1.91102219e-03, 4.10971587e+01,
10^{3}
                                                                                                           203045654e+001d-14360541e+00, 1.20775810e+00],
     10^{-5}
                                10<sup>-3</sup>
                                             10^{-2}
                                                                               10^{-5}
                                                                                            10^{-4}
                   10^{-4}
                                                           10^{-1}
                                                                                                          [6.59699170e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73200699e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
               Across all four plots:
                                                                                                           1.84431987e+01, 8.40904644e+04, 1.91102219e-03, 4.10971587e+01,
                                                                                                           2.03045654e+00, 1.14360541e+00, 1.20775810e+00],
                   RSS (converged)=0.047
                                                                                                          [6.59699170e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73200699e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
                   RSS (initial)=1.441
                                                                                                          1.84431987e+01, 8.40904643e+04, 1.91102219e-03, 4.10971587e+01,
                                                                                                          2.03045654e+00, 1.14360541e+00, 1.20775810e+00],
                   RSS (% reduction)=0.969
                                                                                                          [6.59699170e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                           3.73200698e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
                            epsilon Initial guesses Converged
                                                                                                           1.84431987e+01, 8.40904643e+04, 1.91102219e-03, 4.10971586e+01,
                        51.302066
                                                608.397103 659.699169
                                                                                                          2.03045655e+00, 1.14360541e+00, 1.20775810e+00]]), array([0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.046741
                                                15250.457700 16524.230979
               B s 1273.773279
                                                                                                         0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144,
               C s -472.450450
                                                1668.059050 1195.608600
                                                                                                          0.04674144, 0.04674144, 0.04674144, 0.04674144, 0.04674144,
               Ns
                         -0.057658
                                                 1.198934
                                                                   1.141276
                                                                                                         0.04674144]))
                                                  687.964693 3732.006982
               Ar 3044.042289
                                                                                                             fun: 0.04674144341624299
                                                23497.611400 17920.852532
               B r -5576.758868
                                                                                                          message: 'Optimization terminated successfully.'
                                                                     0.001569
                        -0.060799
                                                 0.062367
               Сr
                                                                                                            nfev: 19177
                         0.867137
                                                                    1.258867
                                                 0.391731
               Νr
                                                                                                             nit: 14505
               A h -572.163349
                                                  590.606548 18.443199
                                                                                                           status: 0
               B h 48803.338573
                                                 35287.125700 84090.464273
                                                                                                          success: True
                         0.001381
                                                  0.000530
                                                                      0.001911
               Сh
                                                                                                               x: array([6.59699169e+02, 1.65242310e+04, 1.19560860e+03, 1.14127580e+00,
                                                                                                         3.73200698e+03, 1.79208525e+04, 1.56865470e-03, 1.25886749e+00,
               Αо
                         40.267329
                                                  0.829830
                                                                      41.097159
                         -2.257714
                                                  4.288170
                                                                      2.030457
                                                                                                         1.84431986e+01, 8.40904643e+04, 1.91102218e-03, 4.10971588e+01,
                         -1.989616
                                                  3.133222
                                                                      1.143605
                                                                                                         2.03045654e+00, 1.14360541e+00, 1.20775810e+00])
                         -0.601260
                                                  1.809018
                                                                      1.207758
               N_o
```

 10^{4}

 10^{3}

 10^{4}