```
final simplex: (array([[5.35447079e+02, 6.75747019e+03, 1.00015140e+03, 9.38187677e-01,
                                                                                                                        1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235022e+00,
                                                                                                                         6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                                        [5.35447076e+02, 6.75747026e+03, 1.00015136e+03, 9.38187663e-01,
                                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235022e+00,
                                                                                                                         6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                                        [5.35447078e+02, 6.75747023e+03, 1.00015138e+03, 9.38187667e-01,
                                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235024e+00,
                                                                                                                        6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                                        [5.35447088e+02, 6.75747019e+03, 1.00015139e+03, 9.38187682e-01,
                                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                        \begin{array}{l} 6.83835638e+02,\ 3.24643802e+04,\ 4.73376905e-04,\ 2.57235022e+00,\\ 6.32148081e-01,\ 9.72768210e-01,\ 2.64017386e+00,\ 1.91933916e+00], \end{array}
                                                                                                                       [5.35447087e+02, 6.75747014e+03, 1.00015140e+03, 9.38187665e-01,
                                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235021e+00,
                                                                                                                         6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                                        [5.35447081e+02, 6.75747024e+03, 1.00015134e+03, 9.38187653e-01,
                                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235021e+00,
                                                                                                                         6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                                        [5.35447079e+02, 6.75747011e+03, 1.00015141e+03, 9.38187661e-01,
                                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
           ['SM data type data plots for mutation', 'Sensor56] 8e+02, 3.2464380 2e+0 4 Initial Guess 6.32148081e-01, 9.72768210 e-01, 9.72768210 e-01,
inducer -> sensor (GFP output)
                                                                          6 \times 10^{3}
                                                                                                                         6.83835638e+02, 3.2464380 e+0 Converged 5e-04, 2.57235021e+00, 6.32148081e-01, 9.72768210 e-01, Converged 7e+03, 9.38187676e-01, 5.35447086e+02, 6.7574702 e+0 Converged 7e+03, 9.38187676e-01,
                                                                                                                         1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                          4 \times 10^{3}
                                                                                                                        6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235020e+00, 6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                                        [5.35447087e+02, 6.75747019e+03, 1.00015140e+03, 9.38187668e-01,
                                                                          3 \times 10^{3}
                                                                                                                         1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6.83835638e+02, 3.⊉4643802e+04, 4.73376905e-04, 2.57235022e+00,
                                                                                                                         6.321<del>48081e 01, 9.</del>72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                                         <del>5.35447085e+02.6.7</del>5747012e+03, 1.00015143e+03, 9.38187672e-01,
1.91617<del>5</del>81e+03.1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                              10-2
                                                                                      10<sup>-5</sup>
                             10^{-3}
                                                              10^{-1}
             10^{-4}
                                                                                                       10^{-4}
                                                                                                     inducer -> S -| Output (GFP)
                                                                                                                        [5.35447090e+02, 6.75747024e+03, 1.00015135e+03, 9.38187665e-01,
                                                                                                                         1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6 83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235022e+00,
                                                                          4 \times 10^{3}
                                                                                                                             32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                                             35447983e+02, 6.75747024e+03, 1.00015140e+03, 9.38187678e-01,
                                                                                                                            .91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6.83835638e + 02, 3.24643802e + 04, 4.73376905e - 04, 2.57235021e + 00, 6.32148081e - 01, 9.72768210e - 01, 2.64017386e + 00, 1.91933916e + 00], 
                                                                          3 \times 10^{3}
                                                                                                                       [5.35447080e+02, 6.75747017e+03, 1.00015141e+03, 9.38187662e-01,
                                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                       \begin{array}{l} 6.83835638e \pm 07.3.24643802e + 04, 4.73376905e - 04, 2.57235021e + 00, \\ 6032148981e - 01, 1972768210e - 01, 2.64017386e + 00, 1.91933916e + 00], \\ [5.35447081e + 02, 6.75747022e + 03, 1.00015133e + 03, 9.38187654e - 01, 2.64017386e + 01, 2.640176e + 01, 2.640176
                                                              10^{-1}
                                                                                       10^{-5}
                                              10^{-2}
                                                                                                       10^{-4}
             10^{-4}
                             10^{-3}
          Across all four plots:
                                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235022e+00,
             RSS (converged)=0.143
                                                                                                                         6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                                        [5.35447072e+02, 6.75747023e+03, 1.00015136e+03, 9.38187656e-01,
             RSS (initial)=2.086
                                                                                                                        1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                         6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235023e+00,
             RSS (% reduction)=0.936
                                                                                                                         6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00]
                                                                                                                       [5.35447093e+02, 6.75747010e+03, 1.00015141e+03, 9.38187673e-01,
                        epsilon Initial_guesses Converged
                                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                 -82.600007
                                                618.047086 535.447079
                                                                                                                         6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235019e+00
         B s -9521.386411
                                                16278.856600 6757.470189
                                                                                                                         6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00]]), array([0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14
                                                1300.653790 1000.151401
        C_s -300.502389
                                                                                                                        0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267,
                                                 1.096541
                    -0.158354
                                                                         0.938188
        N_s
                                                                                                                        0.14258267, 0.14258267, 0.14258267, 0.14258267, 0.14258267,
                                             1916.175610 1916.175610
                    0.000000
                                                                                                                        0.14258267, 0.14258267]))
                                            18874.240800 18874.240800
                    0.000000
                                                                                                                            fun: 0.14258266540993572
        C_r
                                                 0.009030
                                                                          0.009030
                    0.000000
                                                                                                                        message: 'Optimization terminated successfully.'
         Νr
                    0.000000
                                                 0.820433
                                                                          0.820433
                                                                                                                           nfev: 1292
                     0.000000
                                                683.835638
                                                                        683.835638
                                                                                                                            nit: 822
                                             32464.380200 32464.380200
                     0.000000
         Βh
                                                                                                                         status: 0
                                                  0.000473
                     0.000000
                                                                           0.000473
         C h
                    -0.249001
                                                 2.821352
                                                                           2.572350
         Fο
                                                                                                                               x: array([5.35447079e+02, 6.75747019e+03, 1.00015140e+03, 9.38187677e-01,
                     0.000000
                                                 0.632148
                                                                           0.632148
                                                                                                                        1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                     0.000000
                                                 0.972768
                                                                           0.972768
         Во
                                                                                                                        6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.57235022e+00,
                     0.000000
                                                  2.640174
                                                                           2.640174
                                                                                                                        6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00])
         Со
```

 10^{4}

 10^{3}

 10^{4}

 10^{-5}

0.000000

1.919339

1.919339