```
final simplex: (array([[6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                                                          2.06335233e+03, 1.84659734e+04, 6.66439557e-03, 9.83005119e-01,
                                                                                                          9.83405339e+02, 1.79892073e+04, 3.08216349e-04, 3.86392436e-01,
                                                                                                          2.75148751e+00, 3.26464598e+00, 1.35670797e+00],
                                                                                                         [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                                                          2.06335233e+03, 1.84659734e+04, 6.66439557e-03, 9.83005118e-01,
                                                                                                          9.83405339e+02, 1.79892073e+04, 3.08216349e-04, 3.86392434e-01,
                                                                                                          2.75148752e+00, 3.26464598e+00, 1.35670797e+00],
                                                                                                         [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                                                          2.06335233e+03, 1.84659734e+04, 6.66439556e-03, 9.83005119e-01,
                                                                                                          9.83405339e+02, 1.79892073e+04, 3.08216349e-04, 3.86392436e-01,
                                                                                                          2.75148751e+00, 3.26464598e+00, 1.35670797e+00],
                                                                                                         [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                                                          2.06335233e+03, 1.84659734e+04, 6.66439556e-03, 9.83005119e-01,
                                                                                                          9.83405339e+02, 1.79892073e+04, 3.08216349e-04, 3.86392435e-01,
                                                                                                          2.75148752e+00, 3.26464598e+00, 1.35670797e+00],
                                                                                                         [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                                                          2.06335233e+03, 1.84659734e+04, 6.66439557e-03, 9.83005118e-01,
                                                                                                          9.83405338e+02, 1.79892073e+04, 3.08216349e-04, 3.86392434e-01,
                                                                                                          2.75148752e+00, 3.26464598e+00, 1.35670797e+00],
                                                                                                         [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                                                          2.06335233e+03, 1.84659734e+04, 6.66439555e-03, 9.83005119e-01,
            ['SM data type data plots for mutation', 'Output 33] 9e+02, 1.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.7989207 0.
  inducer -> sensor (GFP output)
                                                                                                          2.06335233e+03, 1.84659734e+04Converged 55e-03, 9.83005119e-01,
                                                                                                        9.83405339e+02, 1.7989207 e+0 Converged 49e-04, 3.86392437e-01, 2.75148751e+00, 3.2646459 e+0 Converged 9e+00], [6.64585610e+02, 1.6328602 e+0 Converged 9e+03, 1.16981249e+00,
                                                                  4 \times 10^{3}
                                                                                                          2.06335233e+03, 1.$4659734e+04, 6.66439555e-03, 9.83005119e-01,
                                                                                                          9.83405339e+02, 1.79892073e+04, 3.08216349e-04, 3.86392436e-01,
                                                                  3 \times 10^{3}
                                                                                                          2.75148751e+00, 3.26464598e+00, 1.35670797e+00],
                                                                                                          6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00, 2.06335233e+03, 1.84659735e+04, 6.66439560e-03, 9.83005118e-01, 9.83405338e+02, 1.79892073e+04, 3.08216350e-04, 3.86392430e-01,
                                                                  2 \times 10^{3}
                                                                                                          2.75148752e+00, 3.26464598e+00, 1.35670797e+00],
                                                                                                          6.64585610e+02.1.63286023e+04, 1.26821490e+03, 1.16981249e+00, 2.06335293e+03, 1.84659734e+04, 6.66439557e-03, 9.83005119e-01,
                            10^{-3}
              10^{-4}
                                         10^{-2}
                                                       10^{-1}
                                                                             10^{-5}
                                                                                           10^{-4}
                                                                                         Full circu թե & Քարթե թեթե 02, 1.79892073e+04, 3.08216349e-04, 3.86392436e-01,
     inducer -> S -| Output (GFP)
                                                                                                                    <del>487526+00, 3.</del>26464598e+00, 1.35670797e+00],
                                                                                                       ▶[6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                 6 \times 10^{3}
                                                                                                          2.06335233e+03, 1.$4659734e+04, 6.66439556e-03, 9.83005119e-01,
                                                                                                          $83405339e+02, 1.†9892073e+04, 3.08216349e-04, 3.86392435e-01,
                                                                                                          2.%5148752e+00, 3.26464598e+00, 1.35670797e+00],
                                                                                                         [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                  4 \times 10^{3}
                                                                                                          2.06335233e+03, 1.84659734e+04, 6.66439557e-03, 9.83005118e-01, 9.83405939e+02, 1.79892073e+04, 3.08216350e-04, 3.86392437e-01,
                                                                                                         2.75148751e+00, 3.26464598e+00, 1.35670797e+00], [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                  3 \times 10^3
                                                                                                          2.06335233e+03, 1.$4659734e+04, 6.66439556e-03, 9.83005119e-01,
                                                                                                          <u>9.83405339e+02,-1</u>.79892073e+04, 3.08216349e-04, 3.86392433e-01,
                                                                                                          ᢩᡒ<sub>᠐</sub>ᢆᠯ5148ᡜᢆᢓᡓe+00ᠠ ᡒᢆ-26464598e+00, 1.35670797e+00],
10^{-5}
                            10<sup>-3</sup>
                                          10^{-2}
                                                                             10^{-5}
                                                                                           10^{-4}
              10^{-4}
                                                                                                         [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                                                          2.06335233e+03, 1.84659734e+04, 6.66439557e-03, 9.83005119e-01,
           Across all four plots:
                                                                                                          9.83405339e+02, 1.79892073e+04, 3.08216350e-04, 3.86392435e-01,
                                                                                                          2.75148752e+00, 3.26464598e+00, 1.35670797e+00],
              RSS (converged)=0.051
                                                                                                         [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                                                          2.06335233e+03, 1.84659735e+04, 6.66439557e-03, 9.83005118e-01,
              RSS (initial)=1.634
                                                                                                          9.83405339e+02, 1.79892073e+04, 3.08216350e-04, 3.86392433e-01,
                                                                                                          2.75148752e+00, 3.26464598e+00, 1.35670797e+00],
              RSS (% reduction)=0.97
                                                                                                         [6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
                                                                                                          2.06335233e+03, 1.84659734e+04, 6.66439555e-03, 9.83005119e-01,
                        epsilon Initial guesses Converged
                                                                                                          9.83405339e+02, 1.79892073e+04, 3.08216349e-04, 3.86392436e-01,
                    56.188507
                                             608.397103 664.585610
                                                                                                          2.75148751e+00, 3.26464598e+00, 1.35670797e+00]]), array([0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.0512526, 0.0512526, 0.0512526, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.0512526, 0.051260, 0.051260, 0.051260, 0.051260, 0.051260, 0.051260, 0.051260, 0.051260, 0.051260, 0.05126
          B_s 1078.144577
                                             15250.457700 16328.602277
                                                                                                         0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226,
          C_s -399.844146
                                             1668.059050 1268.214904
                                                                                                         0.05125226, 0.05125226, 0.05125226, 0.05125226, 0.05125226,
                    -0.029121
                                              1.198934
                                                                1.169812
                                              687.964693 2063.352331
          A r 1375.387638
                                                                                                             fun: 0.05125226276095188
          Br -5031.637964
                                             23497.611400 18465.973436
                                                                                                         message: 'Optimization terminated successfully.'
                    -0.055703
                                                                   0.006664
                                              0.062367
          Сr
                                                                                                            nfev: 10512
                     0.591274
                                              0.391731
                                                                   0.983005
          Νr
                                                                                                             nit: 7893
          Ah
                   392.798791
                                              590.606548 983.405339
                                                                                                          status: 0
                                              35287.125700 17989.207262
          B h -17297.918438
                                                                                                         success: True
                    -0.000222
                                               0.000530
                                                                    0.000308
          Сh
                                                                                                               x: array([6.64585610e+02, 1.63286023e+04, 1.26821490e+03, 1.16981249e+00,
          Αо
                    -0.443437
                                              0.829830
                                                                    0.386392
                                                                                                         2.06335233e+03, 1.84659734e+04, 6.66439557e-03, 9.83005119e-01,
                    -1.536683
                                              4.288170
                                                                    2.751488
                                                                                                         9.83405339e+02, 1.79892073e+04, 3.08216349e-04, 3.86392436e-01,
          Со
                     0.131424
                                              3.133222
                                                                    3.264646
                                                                                                         2.75148751e+00, 3.26464598e+00, 1.35670797e+00])
                     -0.452311
                                              1.809018
                                                                    1.356708
          N_o
```

 $10^{4}$ 

 $10^{3}$ 

 $10^{4}$