```
final simplex: (array([[6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                                                                                                                  1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                                                                                                                  2.34323251e+00, 2.00830351e+00, 1.42681452e+00]
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                                                                                                                  1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                                                                                                                  2.34323251e+00, 2.00830351e+00, 1.42681452e+00],
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                                                                                                                  1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                                                                                                                  2.34323251e+00, 2.00830351e+00, 1.42681452e+00],
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                                                                                                                  1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                                                                                                                  2.34323251e+00, 2.00830351e+00, 1.42681452e+00],
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                                                                                                                  1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                                                                                                                  2.34323251e+00, 2.00830351e+00, 1.42681452e+00],
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                  ['SM data type data plots for mutation', 'Output03]6e+03, 2.63947013e+05 initial Guess e-01, 7.76516741e-01, 3.89252755e+02, 5.1681561 e+04 initial Guess e-03, 1.32492437e+00,
                                                                                          inducer ->S \frac{389252755e+02.5.16815619e+04}{284525124169}, \frac{1}{2.0083035}, \frac{1}{2.008305}, \frac
        inducer -> sensor (GFP output)
                                                                                                                 [6.70000458e+02, 1.62567145e+04Converged 33e+03, 1.18675633e+00,
                                                                                                                  1.93730376e+03, 2.63947013e+05Converged 3e-01, 7.76516741e-01,
                                                                                                                  3.89252756e+02, 5.16815619e+0
                                                                                                                                                                                                   5e-03, 1.32492437e+00,
                                                                                                                                                                        \pm 0.0Converged 5.2e+00],
                                                                         4 \times 10^{3}
                                                                                                                  2.34323251e+00, 2.0083035
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                                                                                                                  1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                                                                         3 \times 10^{3}
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                                                                                                                 2.34323251e+00, 2.00830351e+00, 1.42681452e+00], [6.76000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00, 1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
10^{3}
                                                                         2 \times 10^{3}
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                                                                                                                 7.34323251e+00.72.00830351e+00, 1.42681452e+00], [6.70000498e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
     10^{-5}
                   10^{-4}
                                                10^{-2}
                                                                                    10^{-5}
                                  10^{-3}
                                                               10^{-1}
                                                                                                   10^{-4}
                                                                                                inducer -> S -| Output (GFP)
                                                                                                                  2.34323251e+00, 2.\phi0830351e+00, 1.42681452e+00],
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                                                                         4 \times 10^{3}
                                                                                                                  1.93730376e+03, 2.$3947013e+05, 3.84197663e-01, 7.76516741e-01,
                                                                                                                     .89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                                                                                                                      &4323251e+00, 2.\0830351e+00, 1.42681452e+00],
                                                                         3 \times 10^{3}
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                                                                                                                     .9•730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                                                                         2 \times 10^{3}
                                                                                                                  2.34323251e+00, 2.\phi0830351e+00, 1.42681452e+00],
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                                                                                                                   1.93730376e+09, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
10^{3}
                                                                                                                  3099252755e+0215-16815619e+04, 1.13338385e-03, 1.32492437e+00, 2.34323251e+00, 2.00830351e+00, 1.42681452e+00],
                                                                                    10^{-5}
     10<sup>-5</sup>
                                                10^{-2}
                                                                                                   10^{-4}
                    10^{-4}
                                  10^{-3}
                                                               10^{-1}
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                 Across all four plots:
                                                                                                                  1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                    RSS (converged)=0.056
                                                                                                                  2.34323251e+00, 2.00830351e+00, 1.42681452e+00],
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                    RSS (initial)=0.174
                                                                                                                  1.93730376e+03, 2.63947013e+05, 3.84197663e-01, 7.76516741e-01,
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                    RSS (% reduction)=0.757
                                                                                                                  2.34323251e+00, 2.00830351e+00, 1.42681452e+00],
                                                                                                                 [6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                               epsilon Initial guesses
                                                                           Converged
                                                                                                                  1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                           61.603355
                                                     608.397103
                                                                            670.000458
                                                                                                                  3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00
                         1006.256770
                                                    15250.457700 16256.714470
                                                                                                                  2.34323251e+00, 2.00830351e+00, 1.42681452e+00]]), array([0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.055826
               C_s
                                                     1668.059050 1296.235329
                         -371.823721
                                                                                                                 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286, 0.0558286,
                Ns
                            -0.012177
                                                      1.198934
                                                                             1.186756
                                                                                                                 0.0558286, 0.0558286, 0.0558286, 0.0558286]))
                        1249.339069
                                                       687.964693 1937.303762
                                                                                                                     fun: 0.05582860264303072
                Br 240449.401679
                                                      23497.611400 263947.013079
                                                                                                                 message: 'Optimization terminated successfully.'
                Cr
                            0.321830
                                                      0.062367
                                                                            0.384198
                                                                                                                    nfev: 22820
                Nr
                             0.384786
                                                      0.391731
                                                                             0.776517
                                                                                                                     nit: 17379
                Αh
                          -201.353793
                                                      590.606548
                                                                               389.252755
                                                                                                                  status: 0
                                                      35287.125700 51681.561908
                        16394.436208
                                                                                                                 success: True
                                                                             0.001133
                             0.000603
                                                      0.000530
                                                                                                                       x: array([6.70000458e+02, 1.62567145e+04, 1.29623533e+03, 1.18675633e+00,
                             0.495095
                                                      0.829830
                                                                             1.324924
                                                                                                                 1.93730376e+03, 2.63947013e+05, 3.84197662e-01, 7.76516741e-01,
                            -1.944938
                                                      4.288170
                                                                             2.343233
                                                                                                                 3.89252755e+02, 5.16815619e+04, 1.13338385e-03, 1.32492437e+00,
                            -1.124918
                                                      3.133222
                                                                             2.008304
                                                                                                                 2.34323251e+00, 2.00830351e+00, 1.42681452e+00])
                            -0.382204
                                                      1.809018
                                                                             1.426815
                N_o
```

 10^{4}

 10^{4}