```
1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                         6.32150844e+02, 1.82923784e+04, 2.82320227e-04, 5.06240754e+00,
                                                                                                         2.67253500e-03, 5.12686179e-01, 3.30753397e+00, 1.33683244e+00],
                                                                                                        [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                         6.32150851e+02, 1.82923784e+04, 2.82320227e-04, 5.06240754e+00,
                                                                                                         2.67253729e-03, 5.12686179e-01, 3.30753397e+00, 1.33683244e+00],
                                                                                                        [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                         6.32150869e+02, 1.82923783e+04, 2.82320227e-04, 5.06240752e+00,
                                                                                                         2.67254734e-03, 5.12686182e-01, 3.30753397e+00, 1.33683245e+00],
                                                                                                        [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                         6.32150871e+02, 1.82923783e+04, 2.82320227e-04, 5.06240755e+00,
                                                                                                         2.67254549e-03, 5.12686180e-01, 3.30753397e+00, 1.33683245e+00],
                                                                                                        [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.09654125e+00]
                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                         6.32150839e+02, 1.82923784e+04, 2.82320226e-04, 5.06240745e+00,
                                                                                                         2.67253868e-03, 5.12686185e-01, 3.30753396e+00, 1.33683244e+00],
                                                                                                        [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                         6.32150854e+02, 1.82923784e+04, 2.82320227e-04, 5.06240752e+00,
                                                                                                         2.67254104e-03, 5.12686180e-01, 3.30753397e+00, 1.33683244e+00],
                                                                                                        [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
            ['SM data type data plots for mutation', 'Output@10e+02, 1.8292378 1 e+0 Initial Guess 7e-04, 5.06240754e+00, 2.67253715e-03, 5.12686179 e-01, Initial Guess 7e-04, 5.06240754e+00], 2.67253715e-03, 5.12686179 e-01, Initial Guess 7e-04, 5.0624079 e-01, Initial Guess 7e-04, 5
  inducer -> sensor (GFP output)
                                                                                                         6.32150865e+02, 1.$2923783<u>e+0</u>4Converged 26e-04, 5.06240752e+00,
                                                                                                        2.67254603e-03, 5.12686181e-01, 3.30753397e+00, 1.33683245e+00], [6.18047086e+02, 1.62788566e+04 Converged 79e+03, 1.09654125e+00,
                                                                 4 \times 10^{3}
                                                                                                         1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                         6.32150855e+02, 1.82923784e+04, 2.82320227e-04, 5.06240753e+00, 2.67254084e-03, 5.12686180e-01, 3.30753397e+00, 1.33683244e+00],
                                                                 3 \times 10^{3}
                                                                                                         [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.91617961e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01, 6.32150853e+02, 1.82923784e+04, 2.82320227e-04, 5.06240754e+00,
                                                                 2 \times 10^{3}
                                                                                                         2.67253935e-03,5.12686180e-01, 3.30753397e+00, 1.33683244e+00],
                                                                                                        <u>[6]18047086e+02]1.</u>62788566e+04, 1.30065379e+03, 1.09654125e+00,
1091617581e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                            10<sup>-5</sup>
             10^{-4}
                           10-3
                                         10^{-2}
                                                       10^{-1}
                                                                                          10^{-4}
                                                                                        Full circunt 36 14 10 25 10 20 1.82923784e+04, 2.82320227e-04, 5.06240753e+00,
     inducer -> S -| Output (GFP)
                                                                                                                      <del>38176-03, 5.1</del>2686180e-01, 3.30753397e+00, 1.33683244e+00],
                                                                                                      ●[6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                 6 \times 10^{3}
                                                                                                           ..91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
32150846e+02, 1.$2923784e+04, 2.82320226e-04, 5.06240750e+00,
                                                                                                         2.67253841e-03, 5.12686182e-01, 3.30753397e+00, 1.33683244e+00],
                                                                                                        [6.18947086e+02, 1.52788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                 4 \times 10^{3}
                                                                                                         1.91607561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01, 3.32150859e+02, 1.82923784e+04, 2.82320227e-04, 5.06240754e+00, 2.67254114e-03, 5.12686180e-01, 3.30753397e+00, 1.33683244e+00],
                                                                 3 \times 10^{3}
                                                                                                        [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                        \frac{6.32150856e \pm 0.7}{206} \frac{1.82923784e + 04}{2.82320227e - 04}, \frac{5.06240753e + 00}{2.06}, \frac{7.0632542465e - 03}{2.06}, \frac{1.2086180e - 01}{2.06}, \frac{1.33683244e + 00}{2.06}, \frac{1.33683244e + 00}{2.06}, \frac{1.33686e + 02}{2.06}, \frac{1.62788566e + 04}{2.06}, \frac{1.30065379e + 03}{2.06}, \frac{1.09654125e + 00}{2.06}, \frac{1.09654125e + 00}{2.06}
                                                                            10^{-5}
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,
                                                                                                         6.32150857e+02, 1.82923784e+04, 2.82320227e-04, 5.06240755e+00,
              RSS (converged)=0.058
                                                                                                         2.67254099e-03, 5.12686179e-01, 3.30753397e+00, 1.33683244e+00],
                                                                                                        [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
             RSS (initial)=1.605
                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                         6.32150852e+02, 1.82923784e+04, 2.82320227e-04, 5.06240757e+00,
             RSS (% reduction)=0.965
                                                                                                         2.67253596e-03, 5.12686177e-01, 3.30753397e+00, 1.33683244e+00],
                                                                                                        [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                        epsilon Initial_guesses
                                                                 Converged
                                                                                                         1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                     0.000000
                                           618.047086 618.047086
                                                                                                         6.32150857e+02, 1.82923784e+04, 2.82320227e-04, 5.06240754e+00
          Вs
                     0.000000
                                          16278.856600 16278.856600
                                                                                                         0.000000
                                          1300.653790 1300.653790
                                                                                                        0.05761003, 0.05761003, 0.05761003, 0.05761003, 0.05761003,
                     0.000000
                                             1.096541
                                                                  1.096541
          N_s
                                                                                                        0.05761003, 0.05761003, 0.05761003, 0.05761003, 0.05761003,
                    0.000000
                                          1916.175610 1916.175610
                                                                                                        0.05761003, 0.05761003]))
                                         18874.240800 18874.240800
                    0.000000
                                                                                                            fun: 0.05761003114295259
                    0.000000
                                             0.009030
                                                                  0.009030
          Cr
                                                                                                        message: 'Optimization terminated successfully.'
                                             0.820433
          Νr
                    0.000000
                                                                  0.820433
                                                                                                           nfev: 6371
          Αh
                   -51.684794
                                             683.835638 632.150844
                                                                                                            nit: 4667
                                             32464.380200 18292.378411
          B h -14172.001789
                                                                                                         status: 0
                                              0.000473
                    -0.000191
                                                                   0.000282
          C h
                     2.241056
                                             2.821352
                                                                   5.062408
          Fο
                                                                                                              x: array([6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                             0.632148
                    -0.629476
                                                                   0.002673
                                                                                                        1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
         Во
                     -0.460082
                                              0.972768
                                                                   0.512686
                                                                                                        6.32150844e+02, 1.82923784e+04, 2.82320227e-04, 5.06240754e+00,
                     0.667360
                                              2.640174
                                                                   3.307534
                                                                                                        2.67253500e-03, 5.12686179e-01, 3.30753397e+00, 1.33683244e+00])
          Со
```

 $10^{4}$ 

 $10^{3}$ 

 $10^{4}$ 

-0.582507

1.919339

1.336832

final simplex: (array([[6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,