```
final simplex: (array([[9.15277401e+02, 1.17759131e+04, 1.32642615e+03, 1.00226470e+00,
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                           [9.15277403e+02, 1.17759131e+04, 1.32642615e+03, 1.00226471e+00,
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960773e+00,
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                           [9.15277406e+02, 1.17759131e+04, 1.32642617e+03, 1.00226472e+00,
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960773e+00,
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                           [9.15277400e+02, 1.17759131e+04, 1.32642617e+03, 1.00226471e+00,
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                           [9.15277400e+02, 1.17759131e+04, 1.32642617e+03, 1.00226471e+00,
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                           [9.15277397e+02, 1.17759131e+04, 1.32642617e+03, 1.00226471e+00,
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                          [9.15277402e+02, 1.17759131e+04, 1.32642619e+03, 1.00226472e+00,
            ['SM data type data plots for mutation', 'Sensor15 1e+03, 1.88742408 + 04 Initial Guess 3e-03, 8.20433340e-01, cer -> sensor (GFP output) inducer -> \frac{6}{6} | \frac{83835638e+02}{48089e+09} | \frac{3.2464380}{2} | \frac{3.2464380}
  inducer -> sensor (GFP output)
                                                                                                          [9.15277403e+02, 1.17759131e+0 Converged 17e+03, 1.00226471e+00, 1.91617561e+03, 1.8874240 e+0 Converged 3e-03, 8.20433340e-01, 6.83835638e+02, 3.2464380 e+0 Converged 5e-04, 2.76960772e+00, 6.32148081e-01, 9.72768210 Converged +00, 1.91933916e+00],
                                                                   4 \times 10^{3}
                                                                                                           [9.15277402e+02, 1.17759131e+04, 1.32642618e+03, 1.00226471e+00,
                                                                                                           1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
                                                                  3 \times 10^{3}
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                           .9.15277410e+02, 1.17759131e+04, 1.32642617e+03, 1.00226471e+00,
                                                                                                              91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                          10^{-4}
                           10^{-3}
                                          10^{-2}
                                                        10^{-1}
                                                                              10^{-5}
                                                                                            10^{-4}
                                                                                          Full circult % 6175616 b03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01, 6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960773e+00,
     inducer -> S -| Output (GFP)
                                                                   6 \times 10^{3}
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                           [9.15277406e+02, 1.17759131e+04, 1.32642617e+03, 1.00226471e+00,
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01, 6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
                                                                  4 \times 10^{3}
                                                                                                              32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                           😘 🍱 277399e+02, 1. 🖡 7759131e+04, 1.32642616e+03, 1.00226471e+00,
                                                                                                            1\91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                  3 \times 10^{3}
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00, 6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                                                           [9.15277407e+02, 1.17759131e+04, 1.32642619e+03, 1.00226472e+00,
                                                                                                            1,91617561e+03,,,1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                           ნეგ 3835 წეგ დ + 02 ე გ - 24643802e + 04, 4.73376905e - 04, 2.76960772e + 00,
              10^{-4}
10^{-5}
                                                                              10^{-5}
                            10^{-3}
                                          10^{-2}
                                                         10^{-1}
                                                                                            10^{-4}
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
           Across all four plots:
                                                                                                          [9.15277403e+02, 1.17759131e+04, 1.32642618e+03, 1.00226471e+00, 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
              RSS (converged)=0.037
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
              RSS (initial)=0.328
                                                                                                           [9.15277399e+02, 1.17759131e+04, 1.32642617e+03, 1.00226471e+00,
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
              RSS (% reduction)=0.9
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                       epsilon Initial guesses Converged
                                                                                                          [9.15277403e+02, 1.17759131e+04, 1.32642616e+03, 1.00226471e+00,
                  297.230315
                                             618.047086 915.277401
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
          B s -4502.943486
                                            16278.856600 11775.913114
                                                                                                           6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
         C_s
                 25.772362
                                           1300.653790 1326.426152
                                                                                                           6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00]), array([0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.0
                   -0.094277
                                              1.096541
                                                                   1.002265
                                                                                                           0.036592, 0.036592, 0.036592, 0.036592, 0.036592, 0.036592,
                   0.000000
                                          1916.175610 1916.175610
                                                                                                          0.036592, 0.036592, 0.036592, 0.036592, 0.036592]))
          Βr
                    0.000000
                                         18874.240800 18874.240800
                                                                                                              fun: 0.03659199817936004
                    0.000000
                                             0.009030
                                                                   0.009030
                                                                                                           message: 'Optimization terminated successfully.'
          Νr
                    0.000000
                                             0.820433
                                                                   0.820433
                                                                                                             nfev: 1139
                    0.000000
                                           683.835638 683.835638
          Αh
                                                                                                              nit: 699
                                          32464.380200 32464.380200
                    0.000000
          Βh
                                                                                                           status: 0
                    0.000000
                                              0.000473
                                                                   0.000473
          Ch
                                                                                                           success: True
                   -0.051744
                                              2.821352
                                                                   2.769608
                                                                                                                x: array([9.15277401e+02, 1.17759131e+04, 1.32642615e+03, 1.00226470e+00,
          Fο
                    0.000000
                                              0.632148
                                                                   0.632148
          Αо
                                                                                                           1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
         B_o
                    0.000000
                                              0.972768
                                                                   0.972768
                                                                                                          6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.76960772e+00,
                    0.000000
                                              2.640174
                                                                   2.640174
                                                                                                          6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00
          Νo
                    0.000000
                                              1.919339
                                                                   1.919339
```

 $10^{4}$ 

 $10^{3}$ 

 $10^{4}$