```
final simplex: (array([[6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708575e-01,
                                                                                                         2.68531110e+03, 4.89440804e+04, 6.25959799e-04, 7.27271903e-01,
                                                                                                         2.15152434e+00, 3.58194917e+00, 1.18655238e+00],
                                                                                                        [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708574e-01,
                                                                                                         2.68531110e+03, 4.89440804e+04, 6.25959799e-04, 7.27271903e-01,
                                                                                                        2.15152434e+00, 3.58194917e+00, 1.18655238e+00],
                                                                                                        [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708575e-01,
                                                                                                         2.68531110e+03, 4.89440804e+04, 6.25959800e-04, 7.27271903e-01,
                                                                                                        2.15152434e+00, 3.58194917e+00, 1.18655238e+00],
                                                                                                        [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708575e-01,
                                                                                                         2.68531110e+03, 4.89440804e+04, 6.25959800e-04, 7.27271904e-01,
                                                                                                        2.15152434e+00, 3.58194917e+00, 1.18655238e+00],
                                                                                                        [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708575e-01,
                                                                                                         2.68531110e+03, 4.89440804e+04, 6.25959800e-04, 7.27271904e-01,
                                                                                                         2.15152434e+00, 3.58194917e+00, 1.18655238e+00],
                                                                                                        [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708575e-01,
            ['SM data type data plots for mutation', 'Outsut2'] 0e+03, 4.8944080 1e+04 Initial Guess 0e-04, 7.27271903e-01, cer -> sensor (GFP output) inducer -> S_{[6]} 7.997679 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6191417 1.6
  inducer -> sensor (GFP output)
                                                                                                         2.01764009e+03, 2.$657746 ---- 4Converged 09e-02, 9.01708575e-01,
                                                                                                       2.68531110e+03, 4.8944080 (e+0 Converged 9e-04, 7.27271904e-01, 2.15152434e+00, 3.58194917e+0 Converged 3e+00], [6.71977679e+02, 1.6191417 (Converged 3e+03, 1.19909662e+00,
                                                                 4 \times 10^{3}
                                                                                                         2.01764009e+03, 2.$6577461e+04, 1.17311109e-02, 9.01708574e-01,
                                                                                                         2.68531110e+03, 4.$9440804e+04, 6.25959799e-04, 7.27271904e-01,
                                                                 3 \times 10^3
                                                                                                         2.15152434e+00, 3.$8194917e+00, 1.18655238e+00],
                                                                                                         6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00, 2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708574e-01, 2.68531110e+03, 4.89440804e+04, 6.25959799e-04, 7.27271903e-01,
                                                                 2 \times 10^{3}
                                                                                                         2.15152434e+00, 3.58194917e+00, 1.18655238e+00],
                                                                                                         6.71977679e+02.1.61914174e+04, 1.32317563e+03, 1.19909662e+00, <math>2.56577461e+04, 1.17311109e-02, 9.01708574e-01,
                           10^{-3}
             10^{-4}
                                         10^{-2}
                                                       10^{-1}
                                                                            10^{-5}
                                                                                          10^{-4}
                                                                                        Full circuat 68521 $186603, 4.89440804e+04, 6.25959799e-04, 7.27271904e-01,
     inducer -> S -| Output (GFP)
                                                                                                                    <del>24346+00, 3.</del>58194917e+00, 1.18655238e+00],
                                                                      10^{4}
                                                                                                        [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         201764009e+03, 2.$6577461e+04, 1.17311109e-02, 9.01708574e-01,
                                                                                                         2.63591110e+03, 4.$9440804e+04, 6.25959800e-04, 7.27271902e-01,
                                                                                                       2.15152<del>434e+00, 9</del>.58194917e+00, 1.18655238e+00], [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                 6 \times 10^{3}
                                                                                                         2.01764009e+03, 2.$6577461e+04, 1.17311109e-02, 9.01708574e-01,
                                                                 4 \times 10^{3}
                                                                                                         2.68531110e+03, 4.$9440804e+04, 6.25959799e-04, 7.27271903e-01,
                                                                                                           、15152434e+00, 3.$8194917e+00, 1.18655238e+00],
                                                                 3 \times 10^{3}
                                                                                                        [6. 1977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.$6577461e+04, 1.17311109e-02, 9.01708575e-01,
                                                                                                         <u>2.68531110e+03, 4</u>.89440804e+04, 6.25959800e-04, 7.27271904e-01,
                                                                                                         2<sub>0</sub>15152433e+00<sub>1</sub>3-58194917e+00, 1.18655238e+00],
                                         10^{-2}
10^{-5}
                           10^{-3}
                                                       10^{-1}
                                                                            10^{-5}
                                                                                         10^{-4}
              10^{-4}
                                                                                                        [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708575e-01,
           Across all four plots:
                                                                                                         2.68531110e+03, 4.89440804e+04, 6.25959799e-04, 7.27271904e-01,
                                                                                                         2.15152434e+00, 3.58194917e+00, 1.18655238e+00],
              RSS (converged)=0.051
                                                                                                        [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708575e-01,
              RSS (initial)=5.32
                                                                                                         2.68531110e+03, 4.89440804e+04, 6.25959800e-04, 7.27271903e-01,
                                                                                                        2.15152434e+00, 3.58194917e+00, 1.18655238e+00],
              RSS (% reduction)=0.99
                                                                                                        [6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                         2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708574e-01,
                        epsilon Initial guesses Converged
                                                                                                         2.68531110e+03, 4.89440804e+04, 6.25959799e-04, 7.27271905e-01,
                    63.580576
                                            608.397103 671.977679
                                                                                                        2.15152434e+00, 3.58194917e+00, 1.18655238e+00]]), array([0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.0510242, 0.0510242, 0.0510242, 0.05102424, 0.051024242, 0.0510242, 0.05102424, 0.05102424, 0.0510244, 0.0510244, 0
                  940.959749
                                           15250.457700 16191.417449
                                                                                                       0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242,
          C_s -344.883421
                                            1668.059050 1323.175629
                                                                                                        0.05102242, 0.05102242, 0.05102242, 0.05102242, 0.05102242,
                     0.000163
                                             1.198934 1.199097
                                                                                                       0.05102242]))
                                              687.964693 2017.640091
          A r 1329.675398
                                                                                                           fun: 0.05102242025629961
                                            23497.611400 25657.746112
          B r 2160.134712
                                                                                                        message: 'Optimization terminated successfully.'
                   -0.050636
                                             0.062367
                                                                  0.011731
          Сr
                                                                                                          nfev: 27096
                    0.509978
                                             0.391731
                                                                  0.901709
          Νr
                                                                                                           nit: 20566
          A h 2094.704551
                                               590.606548 2685.311099
                                                                                                         status: 0
          B h 13656.954674
                                             35287.125700 48944.080374
                                                                                                        success: True
          C h
                     0.000096
                                              0.000530
                                                                   0.000626
                                                                                                             x: array([6.71977679e+02, 1.61914174e+04, 1.32317563e+03, 1.19909662e+00,
                                                                                                        2.01764009e+03, 2.56577461e+04, 1.17311109e-02, 9.01708575e-01,
          Αо
                    -0.102558
                                              0.829830
                                                                   0.727272
                    -2.136646
                                              4.288170
                                                                   2.151524
                                                                                                        2.68531110e+03, 4.89440804e+04, 6.25959799e-04, 7.27271903e-01,
          Со
                     0.448727
                                             3.133222
                                                                   3.581949
                                                                                                       2.15152434e+00, 3.58194917e+00, 1.18655238e+00])
                    -0.622466
                                              1.809018
                                                                   1.186552
          N_o
```

 10^{4}

 10^{3}

 10^{4}