```
final simplex: (array([[6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                                         1.98097617e+03, 3.75848412e+04, 2.24483953e-02, 8.43773297e-01,
                                                                                         6.35870204e+02, 3.12131523e+04, 5.01788231e-04, 5.50420789e-02,
                                                                                         3.15567492e+00, 2.84776898e+00, 1.44943322e+00],
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                                         1.98097617e+03, 3.75848412e+04, 2.24483952e-02, 8.43773298e-01,
                                                                                         6.35870204e+02, 3.12131523e+04, 5.01788231e-04, 5.50420798e-02,
                                                                                         3.15567492e+00, 2.84776898e+00, 1.44943322e+00],
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                                         1.98097617e+03, 3.75848411e+04, 2.24483952e-02, 8.43773298e-01,
                                                                                         6.35870203e+02, 3.12131523e+04, 5.01788231e-04, 5.50420804e-02,
                                                                                         3.15567492e+00, 2.84776898e+00, 1.44943322e+00],
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                                         1.98097617e+03, 3.75848412e+04, 2.24483953e-02, 8.43773297e-01,
                                                                                         6.35870204e+02, 3.12131523e+04, 5.01788231e-04, 5.50420799e-02,
                                                                                         3.15567492e+00, 2.84776898e+00, 1.44943322e+00],
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                                         1.98097617e+03, 3.75848412e+04, 2.24483953e-02, 8.43773297e-01,
                                                                                         6.35870204e+02, 3.12131523e+04, 5.01788231e-04, 5.50420793e-02,
                                                                                         3.15567492e+00, 2.84776898e+00, 1.44943322e+00]
        ['SM data type data plots for mutation', 'Outpout96] 7e+03, 3.7584841 e+0 Initial Guess 2e-04, 5.50420798e-01, 6.358Z0204e+02, 3.1213152 e+04, 5.50420798e-02,
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                     inducer ->S \frac{6}{3} \frac{35870204e+02}{567492e+00}, \frac{3}{2}.8477689 \frac{3}{2} \frac{10173025}{6} \frac{1}{2} \frac{1}{2
inducer -> sensor (GFP output)
                                                                                        [6.64724576e+02, 1.63604504e+0 Converged 22e+03, 1.16801306e+00, 1.98097617e+03, 3.75848412e+04Converged 22e+02, 8.43773298e-01, 6.35870204e+02, 3.12131523e+04Converged 22e+04, 5.50420777e-02,
                                                                                                                                       Converged _{2e+00},
                                                       4 \times 10^{3}
                                                                                         3.15567492e+00, 2.$477689
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                                         1.98097617e+03, 3.75848412e+04, 2.24483952e-02, 8.43773298e-01,
                                                       3 \times 10^{3}
                                                                                         6.3587020<del>4</del>e+02, 3.12131523e+04, 5.01788231e-04, 5.50420795e-02,
                                                                                        15567492e+00, 2.84776898e+00, 1.44943322e+00], [6.64724976e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00, 1.98097617e+03, 3.75848412e+04, 2.24483952e-02, 8.43773297e-01,
                                                       2 \times 10^3
                                                                                         6.35870204e+02, 3.12131523e+04, 5.01788231e-04, 5.50420805e-02,
                                                                                         <del>'3"15567492e+00"2.</del>84776898e+00, 1.44943322e+00],
[6<sup>0</sup>64724596e+02<sup>1</sup>, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                      10<sup>-3</sup>
                                  10^{-2}
                                                                10^{-5}
                                                                            10^{-4}
                                              10^{-1}
                                                                           Full circult % 047 617 617 610 03, 3.75848412e+04, 2.24483953e-02, 8.43773297e-01.
  inducer -> S -| Output (GFP)
                                                                                               <del>5870204e+02, 3.1</del>2131523e+04, 5.01788231e-04, 5.50420781e-02,
                                                                                         3.15567492e+00, 2.$4776898e+00, 1.44943322e+00],
                                                       6 \times 10^3
                                                                                         [6.64724576e+02, 1.$3604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                                            ,98097617e+03, 3.₹5848412e+04, 2.24483952e-02, 8.43773298e-01,
                                                                                         635870204e+02, 3.12131523e+04, 5.01788231e-04, 5.50420788e-02,
                                                                                         3.\5567492e+00, 2.\$4776898e+00, 1.44943322e+00],
                                                       4 \times 10^{3}
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                                            .98027617e+03, 3.75848412e+04, 2.24483953e-02, 8.43773297e-01,
                                                                                         6.35870204e+02, 3.12131523e+04, 5.01788231e-04, 5.50420789e-02,
                                                       3 \times 10^{3}
                                                                                         3.15567492e+00, 2.$4776898e+00, 1.44943322e+00],
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                                                                                            <u>,98097617e+03, 3</u>.75848412e+04, 2.24483953e-02, 8.43773297e-01,
                                                                                         6_035870205e+02_13-12131523e+04, 5.01788231e-04, 5.50420789e-02, 3.15567492e+00, 2.84776898e+00, 1.44943322e+00],
                                                                10<sup>-5</sup>
                                                                            10^{-4}
                      10<sup>-3</sup>
                                  10^{-2}
                                              10^{-1}
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
       Across all four plots:
                                                                                         1.98097617e+03, 3.75848412e+04, 2.24483953e-02, 8.43773297e-01,
                                                                                         6.35870204e+02, 3.12131523e+04, 5.01788231e-04, 5.50420802e-02,
          RSS (converged)=0.052
                                                                                         3.15567492e+00, 2.84776898e+00, 1.44943322e+00],
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
          RSS (initial) = 0.732
                                                                                         1.98097617e+03, 3.75848412e+04, 2.24483953e-02, 8.43773297e-01,
                                                                                         6.35870205e+02, 3.12131523e+04, 5.01788231e-04, 5.50420794e-02,
          RSS (% reduction)=0.933
                                                                                         3.15567492e+00, 2.84776898e+00, 1.44943322e+00],
                                                                                         [6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
                  epsilon Initial guesses Converged
                                                                                         1.98097617e+03, 3.75848411e+04, 2.24483951e-02, 8.43773298e-01,
               56.327473
                                     608.397103 664.724576
                                                                                         6.35870203e+02, 3.12131523e+04, 5.01788231e-04, 5.50420813e-02
      B s 1109.992748
                                    15250.457700 16360.450448
                                                                                         3.15567492e+00, 2.84776898e+00, 1.44943322e+00]]), array([0.0522231, 0.0522231, 0.0522231, 0.0522231, 0.0522231, 0.0522231,
            -408.784832
                                     1668.059050 1259.274218
                                                                                         0.0522231, 0.0522231, 0.0522231, 0.0522231, 0.0522231,
                                      1.198934
                                                       1.168013
               -0.030920
                                                                                         0.0522231, 0.0522231, 0.0522231, 0.0522231]))
                                      687.964693 1980.976172
            1293.011479
                                                                                            fun: 0.052223095733307565
      B r 14087.229800
                                     23497.611400 37584.841200
                                                                                         message: 'Optimization terminated successfully.'
               -0.039919
                                      0.062367
                                                        0.022448
                                                                                           nfev: 13917
                0.452042
                                      0.391731
                                                        0.843773
                                                                                            nit: 10510
               45.263656
                                     590.606548
                                                       635.870204
                                                                                         status: 0
                                     35287.125700 31213.152283
             -4073.973417
                                                                                         success: True
               -0.000028
                                      0.000530
                                                        0.000502
                                                                                              x: array([6.64724576e+02, 1.63604504e+04, 1.25927422e+03, 1.16801306e+00,
               -0.774788
                                      0.829830
                                                        0.055042
                                                                                         1.98097617e+03, 3.75848412e+04, 2.24483953e-02, 8.43773297e-01,
               -1.132495
                                      4.288170
                                                        3.155675
                                                                                         6.35870204e+02, 3.12131523e+04, 5.01788231e-04, 5.50420789e-02,
               -0.285453
                                      3.133222
                                                        2.847769
                                                                                         3.15567492e+00, 2.84776898e+00, 1.44943322e+00])
                                      1.809018
                                                        1.449433
               -0.359585
```

 10^{4}

 10^{3}

 10^{4}

 10^{-5}

 10^{-5}

 10^{-4}

 10^{-4}

 C_s

Cr

Nr

C h

Νo