```
final simplex: (array([[6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79985858e+03, 1.33009050e+04, 4.79452734e-03, 8.15699504e-01,
                                                                                       1.57026971e+03, 3.44031924e+04, 7.01197658e-04, 5.72867978e-01,
                                                                                       1.99082248e+00, 3.02358372e+00, 1.56762908e+00],
                                                                                      [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79985858e+03, 1.33009050e+04, 4.79452733e-03, 8.15699504e-01,
                                                                                       1.57026971e+03, 3.44031923e+04, 7.01197658e-04, 5.72867978e-01,
                                                                                       1.99082248e+00, 3.02358372e+00, 1.56762908e+00],
                                                                                      [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79985858e+03, 1.33009050e+04, 4.79452734e-03, 8.15699504e-01,
                                                                                       1.57026971e+03, 3.44031923e+04, 7.01197657e-04, 5.72867977e-01,
                                                                                       1.99082249e+00, 3.02358373e+00, 1.56762908e+00],
                                                                                      [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79985858e+03, 1.33009051e+04, 4.79452735e-03, 8.15699505e-01,
                                                                                       1.57026971e+03, 3.44031923e+04, 7.01197658e-04, 5.72867979e-01,
                                                                                       1.99082248e+00, 3.02358372e+00, 1.56762908e+00],
                                                                                      [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79985858e+03, 1.33009050e+04, 4.79452733e-03, 8.15699505e-01,
                                                                                       1.57026971e+03, 3.44031923e+04, 7.01197658e-04, 5.72867978e-01,
                                                                                       1.99082248e+00, 3.02358372e+00, 1.56762908e+00],
                                                                                      [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79985858e+03, 1.33009051e+04, 4.79452735e-03, 8.15699505e-01,
        ['SM data type data plots for mutation', 'Output 507] e+03, 3.44031923e+04 Initial Guess 7e-04, 5.72867978e-01, inducer -> sensor (GFP output) inducer -> sensor (GFP output) inducer -> sensor (GFP output) inducer -> sensor (GFP output)
  inducer -> sensor (GFP output)
                                                                                       1.79985858e + 03, 1.3300905 - - 04 Converged 36e - 03, 8.15699504e - 01,
                                                                                       1.57026971e+03, 3.44031923e+04Converged 53e-04, 5.72867978e-01, 1.99082248e+00, 3.02358372e+00Converged 3e+00],
                                                                                      [6.41546159e+02, 1.6270679 te+to Converged 13e+03, 1.12002563e+00,
                                                      4 \times 10^{3}
                                                                                       1.79985858e+03, 1.\$3009050e+04, 4.79452734e-03, 8.15699505e-01,
                                                                                       1.57026971e+03, 3.44031923e+04, 7.01197656e-04, 5.72867979e-01,
                                                      3 \times 10^{3}
                                                                                       1.99082248e+00, 3.02358372e+00, 1.56762908e+00],
                                                                                          4<mark>154</mark>6159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79085858e+03, 1.33009050e+04, 4.79452734e-03, 8.15699504e-01, 1.57026971e+03, 3.44031924e+04, 7.01197659e-04, 5.72867977e-01,
                                                      2 \times 10^{3}
                                                                                       1.99082248e+00, 3.\psi 2358372e+00, 1.56762908e+00],
                                                                                       6.41546159e+02.1.62706790e+04, 1.21301118e+03, 1.12002563e+00, 1.073985898e+03, 1.33009050e+04, 4.79452735e-03, 8.15699504e-01,
           10^{-4}
                      10^{-3}
                                  10^{-2}
                                              10^{-1}
                                                               10^{-5}
                                                                           10^{-4}
                                                                         Full circult 57026 87 lipe 03, 3.44031923e+04, 7.01197658e-04, 5.72867978e-01,
    inducer -> S -| Output (GFP)
                                                                                             <del>0822486+00, 3.</del>02358372e+00, 1.56762908e+00],
                                                                                      [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                      4 \times 10^{3}
                                                                                       1.79985858e+03, 1.33009051e+04, 4.79452736e-03, 8.15699504e-01,
                                                                                         .57026971e+03, 3.44031924e+04, 7.01197658e-04, 5.72867978e-01,
                                                                                       1\99082248e+00, 3.\02358372e+00, 1.56762908e+00],
                                                      3 \times 10^{3}
                                                                                       [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                        •79985858e+03, 1.$3009050e+04, 4.79452734e-03, 8.15699504e-01,
                                                                                      1.57026971e+03, 3.44031923e+04, 7.01197658e-04, 5.72867977e-01, 1.99082248e+00, 3.02358372e+00, 1.56762908e+00], [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00, 1.79985858e+03, 1.33009050e+04, 4.79452735e-03, 8.15699504e-01,
                                                      2 \times 10^3
                                                                                         <u>,5702697,1e+09, 3.4</u>4031924e+04, 7.01197659e-04, 5.72867979e-01,
                                                                                       <u>ქტ</u>9082<u>7</u>47e+00<u>1</u> გ-02358372e+00, 1.56762908e+00],
                                  10^{-2}
                                                                           10^{-4}
10^{-5}
                       10^{-3}
                                              10^{-1}
           10^{-4}
                                                                10^{-5}
                                                                                       [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79985858e+03, 1.33009051e+04, 4.79452736e-03, 8.15699504e-01,
         Across all four plots:
                                                                                       1.57026971e+03, 3.44031923e+04, 7.01197658e-04, 5.72867978e-01,
                                                                                       1.99082248e+00, 3.02358372e+00, 1.56762908e+00],
           RSS (converged)=0.07
                                                                                      [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79985858e+03, 1.33009050e+04, 4.79452734e-03, 8.15699505e-01,
           RSS (initial) = 0.767
                                                                                       1.57026971e+03, 3.44031924e+04, 7.01197659e-04, 5.72867977e-01,
                                                                                       1.99082248e+00, 3.02358372e+00, 1.56762908e+00],
           RSS (% reduction)=0.916
                                                                                      [6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
                                                                                       1.79985858e+03, 1.33009050e+04, 4.79452735e-03, 8.15699504e-01,
                    epsilon Initial guesses Converged
                                                                                       1.57026971e+03, 3.44031924e+04, 7.01197658e-04, 5.72867978e-01,
                33.149056
                                     608.397103 641.546159
                                                                                       1.99082248e+00, 3.02358372e+00, 1.56762908e+00]), array([0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.070156664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.070
        B_s 1020.221330
                                     15250.457700 16270.679030
                                                                                      0.07015664, 0.07015664, 0.07015664, 0.07015664,
        C s -455.047872
                                     1668.059050 1213.011178
                                                                                      0.07015664, 0.07015664, 0.07015664, 0.07015664, 0.07015664,
        Νs
                -0.078908
                                      1.198934 1.120026
                                                                                      0.07015664]))
        Ar 1111.893884
                                      687.964693 1799.858577
                                                                                         fun: 0.07015664446818655
        Br-10196.706377
                                     23497.611400 13300.905023
                                                                                      message: 'Optimization terminated successfully.'
                -0.057573
                                      0.062367
                                                       0.004795
        Сr
                                                                                        nfev: 15935
                 0.423969
                                      0.391731
                                                       0.815700
        Νr
                                                                                         nit: 12049
                979.663159
                                      590.606548 1570.269707
        Αh
                                                                                       status: 0
                                     35287.125700 34403.192352
        Βh
               -883.933348
                                                                                      success: True
                 0.000171
                                      0.000530
                                                        0.000701
        Сh
                                                                                           x: array([6.41546159e+02, 1.62706790e+04, 1.21301118e+03, 1.12002563e+00,
        Αо
                 -0.256962
                                      0.829830
                                                        0.572868
                                                                                      1.79985858e+03, 1.33009050e+04, 4.79452734e-03, 8.15699504e-01,
                 -2.297348
                                      4.288170
                                                        1.990822
                                                                                      1.57026971e+03, 3.44031924e+04, 7.01197658e-04, 5.72867978e-01,
                 -0.109638
                                      3.133222
                                                        3.023584
                                                                                      1.99082248e+00, 3.02358372e+00, 1.56762908e+00])
                 -0.241389
                                      1.809018
                                                        1.567629
        N_o
```

 10^{4}

 10^{3}

 10^{4}