```
final simplex: (array([[1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                                                              3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2.11243287e-02, 1.17740922e+00, 3.49189021e+00]
                                                                                                             [1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                                                              3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2.11243287e-02, 1.17740922e+00, 3.49189021e+00]
                                                                                                             [1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                                                              3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2.11243287e-02, 1.17740922e+00, 3.49189021e+00]
                                                                                                             [1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                                                              3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2.11243287e-02, 1.17740922e+00, 3.49189021e+00],
                                                                                                             [1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                                                              3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2.11243287e-02, 1.17740922e+00, 3.49189021e+00]
                                                                                                             [1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
           ['SM data type data plots for mutation', 'Sensor 88] 9e+01, 2.9885261 6e+05 Initial Guess 7e-04, 6.95637690e+00, corporate (CER autrust) indusor > 62 11243287e-02, 1,17740922 e+00, 349189021 e+00],
                                                                                     inducer -> S_{11}^{21} \frac{1}{1} \frac{1}{2} \frac{1}{4} \frac{1}{1} \frac{1}{2} \frac{1}{4} \frac{1}{1} \frac{1}{2} \frac{1}{4} \frac{1}{1} \frac{1}{2} \frac{1}{4} \frac{1}{2} \frac{1}{4} 
inducer -> sensor (GFP output)
                                                                                                              2.15978522e+03, 3.43765697e+05Converged 85e-03, 2.43244231e+00,
                                                                                                             3.02301859e+01, 2.9885261 e+05Converged
                                                                   6 \times 10^{3}
                                                                                                                                                                                                97e-04, 6.95637690e+00,
                                                                                                              2.11243287e-02, 1.17740922e+00
                                                                                                                                                                                                 Le+00],
                                                                                                                                                                     Converged 23e+03, 1.41479600e+00,
                                                                                                             [1.22146520e+03, 6.9392798
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                    4 \times 10^{3}
                                                                                                              3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2.11243287e-02, 1.17740922e+00, 3.49189021e+00],
                                                                                                             [1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                   3 \times 10^{3}
                                                                                                               2.15978522e+03, 3.$3765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                                                                 Q2301859e+01, 2.$8852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2.112<del>43287e 02, 1.</del>17740922e+00, 3.49189021e+00],
                                                                                                              1.22146520e+03,6.93927989e+03,1.40201623e+03,1.41479600e+00,
2.15978322e+03,3.43765698e+05,4.83602885e-03,2.43244231e+00,
                                          10^{-2}
                                                        10^{-1}
                                                                               10^{-5}
                                                                                              10^{-4}
                                                                                            Full circuի Արի են բարեն 1, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
   inducer -> S -| Output (GFP)
                                                                                                                    <del>12432876-02, 1.1</del>7740922e+00, 3.49189021e+00]
                                                                    6 \times 10^{3}
                                                                                                             [1.22146520e+03, 6.$3927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00, 3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00, 2.43242307e-04, 6.95637690e+00, 2.43242308-04, 6.95637690e+00, 2.4324208-04, 6.95637690e+00, 2.432408-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 6.95608-04, 
                                                                                                              2.1\(\frac{1}{2}\)43287e-02, 1.1\(\frac{1}{7}\)740922e+00, 3.49189021e+00],
                                                                   4 \times 10^{3}
                                                                                                                 .22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978 <del>22e+09</del>, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00, 3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                   3 \times 10^{3}
                                                                                                              2.\\243287e-02, 1.1\\\7740922e+00, 3.49189021e+00]
                                                                                                             [1.22\46520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                                                              3.02301859e+01,.2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2011243287e-02,1017740922e+00, 3.49189021e+00],
                                                                               10^{-5}
                                                                                              10^{-4}
                                          10^{-2}
                                                         10^{-1}
                                                                                                             [1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                                                              3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2.11243287e-02, 1.17740922e+00, 3.49189021e+00],
            RSS (converged)=0.017
                                                                                                             [1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                                                                              3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                                                                              2.11243287e-02, 1.17740922e+00, 3.49189021e+00]
            RSS (% reduction)=0.989
                                                                                                             [1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                                                                              2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                        epsilon Initial guesses
                                                                      Converged
                                                                                                              3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                               608.397103 1221.465197
                                                                                                              2.11243287e-02, 1.17740922e+00, 3.49189021e+00]]), array([0.01745553, 0.01745553, 0.01745553, 0.01745553, 0.01745553,
                                              15250.457700 6939.279894
                                                                                                            0.01745553, 0.01745553, 0.01745553, 0.01745553, 0.01745553,
                                              1668.059050 1402.016234
                                                                                                             0.01745553, 0.01745553, 0.01745553, 0.01745553, 0.01745553,
                                               1.198934
                                                                       1.414796
                                                                                                            0.01745553]))
                                                687.964693 2159.785220
                                                                                                                 fun: 0.017455529399947028
                                                23497.611400 343765.697447
                                                                                                             message: 'Optimization terminated successfully.'
                                               0.062367
                                                                       0.004836
                                                                                                                nfev: 33038
                                               0.391731
                                                                       2.432442
                                                                                                                 nit: 25063
                                                590.606548
                                                                          30.230186
                                                                                                              status: 0
                                                35287.125700 298852.615829
                                                                                                            success: True
                                                0.000530
                                                                       0.000103
                                                                                                                   x: array([1.22146520e+03, 6.93927989e+03, 1.40201623e+03, 1.41479600e+00,
                                                0.829830
                                                                       6.956377
                                                                                                             2.15978522e+03, 3.43765697e+05, 4.83602885e-03, 2.43244231e+00,
                                                4.288170
                                                                       0.021124
                                                                                                             3.02301859e+01, 2.98852616e+05, 1.03226397e-04, 6.95637690e+00,
                                                3.133222
                                                                       1.177409
                                                                                                            2.11243287e-02, 1.17740922e+00, 3.49189021e+00])
                                                1.809018
                                                                       3.491890
```

 10^{4}

 10^{3}

 10^{5}

 10^{4}

 10^{-5}

 10^{-4}

 10^{-4}

 10^{-3}

10⁻³

Across all four plots:

RSS (initial)=1.583

613.068094

-8311.177806

-266.042816

1471.820527

-0.057531

2.040711

-560.376362

-0.000427

6.126547

-4.267046

-1.955813

1.682872

B r 320268.086047

B h 263565.490129

C r

Νr

Αh

C h

Αо

Со

N_o

0.215862