```
final simplex: (array([[6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
                                                                                      4.14006404e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                                                      1.64271099e+00, 1.85807112e+00, 1.26213069e+00],
                                                                                     [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898391e-02, 9.30398309e-01,
                                                                                      4.14006402e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                                                      1.64271099e+00, 1.85807112e+00, 1.26213069e+00],
                                                                                     [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898391e-02, 9.30398309e-01,
                                                                                      4.14006402e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                                                     1.64271099e+00, 1.85807112e+00, 1.26213069e+00],
                                                                                     [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
                                                                                      4.14006404e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                                                      1.64271099e+00, 1.85807112e+00, 1.26213069e+00],
                                                                                     [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898391e-02, 9.30398309e-01,
                                                                                      4.14006402e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                                                      1.64271099e+00, 1.85807112e+00, 1.26213069e+00],
                                                                                     3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
          inducer -> sensor (GFP output)
                                                                                      3.91896305e+03, 2.25732352e+05Converged 90e-02, 9.30398309e-01,
                                                                                      4.14006403e+01, 6.65491037e+04Converged 74e-03, 3.82218135e+00,
                                                                                      1.64271099e+00, 1.$5807112e+0
                                                                                                                                                  9e+00],
                                                                                     [6.61201462e+02, 1.6386172 e+0 Converged 9e+03, 1.15812457e+00,
                                                       6 \times 10^{3}
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
                                                                                        .140<mark>0</mark>6403e+01, 6.$5491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                       4 \times 10^{3}
                                                                                      1.64271099e+00, 1.$5807112e+00, 1.26213069e+00],
                                                                                     [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                       3 \times 10^{3}
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
                                                                                      4_14006404e+01, 6.65491037e+04, 1.39452373e-03, 3.82218135e+00,
                                                                                      1.64271099e+00, 1.85807112e+00, 1.26213069e+00],
                                                                                      6.61201462e+02.1.63861726e+04, 1.24660209e+03, 1.15812457e+00, 3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
                                                               10^{-5}
              10^{-4}
                         10^{-3}
                                    10^{-2}
                                               10^{-1}
                                                                          10^{-4}
                                                                         Full circuft ԱԳՐԻՐԵՆԵՐ 6.65491037e+04, 1.39452373e-03, 3.82218135e+00,
        inducer -> S -| Output (GFP)
                                                                                                <del>[0996+00, 1.</del>85807112e+00, 1.26213069e+00],
                                                                                     [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                       4 \times 10^{3}
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898389e-02, 9.30398310e-01,
                                                                                        ,14006403e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                       3 \times 10^{3}
                                                                                      1.84271099e+00, 1.85807112e+00, 1.26213069e+00],
                                                                                      [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                                                      918963<del>05e+03, 2</del>.‡5732352e+05, 8.39898391e-02, 9.30398309e-01,
                                                                                     4.14006403e+01, 6.65491037e+04, 1.39452373e-03, 3.82218135e+00, 1.64271099e+00, 1.85807112e+00, 1.26213069e+00], [6.61261462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00, 3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
                                                       2 \times 10^{3}
10^{3}
                                                                                      <u>4.14006403e</u>901, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                                                      1064271999e+001d-85807112e+00, 1.26213069e+00],
                                                                          10^{-4}
    10^{-5}
                          10<sup>-3</sup>
                                    10^{-2}
                                                                10^{-5}
               10^{-4}
                                               10^{-1}
                                                                                     [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
            Across all four plots:
                                                                                      4.14006404e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                                                      1.64271099e+00, 1.85807112e+00, 1.26213069e+00],
               RSS (converged)=0.052
                                                                                     [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
               RSS (initial) = 1.554
                                                                                      4.14006403e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                                                                     1.64271099e+00, 1.85807112e+00, 1.26213069e+00],
               RSS (% reduction)=0.968
                                                                                     [6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
                                                                                      3.91896305e+03, 2.25732352e+05, 8.39898389e-02, 9.30398309e-01,
                       epsilon Initial guesses
                                                         Converged
                                                                                      4.14006402e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
                                       608.397103
                    52.804359
                                                          661.201462
                                                                                     1.64271099e+00, 1.85807112e+00, 1.26213069e+00]), array([0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187, 0
                  1135.714884
                                       15250.457700 16386.172584
                                                                                     0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187,
                   -421.456964
                                        1668.059050 1246.602086
                                                                                     0.05215187, 0.05215187, 0.05215187, 0.05215187, 0.05215187,
                     -0.040809
                                        1.198934
                                                         1.158125
                  3230.998354
                                         687.964693 3918.963047
                                                                                        fun: 0.052151872722334264
            B r 202234.740197
                                         23497.611400 225732.351597
                                                                                     message: 'Optimization terminated successfully.'
            Сr
                     0.021623
                                        0.062367
                                                         0.083990
                                                                                       nfev: 21089
                     0.538667
                                        0.391731
                                                         0.930398
            Νr
                                                                                        nit: 16004
                   -549.205908
                                         590.606548
                                                            41.400640
            Αh
                                                                                      status: 0
                  31261.978011
                                        35287.125700 66549.103711
            Βh
                                                                                     success: True
            C h
                      0.000865
                                         0.000530
                                                          0.001395
                                                                                          x: array([6.61201462e+02, 1.63861726e+04, 1.24660209e+03, 1.15812457e+00,
            Αо
                      2.992352
                                         0.829830
                                                          3.822181
                                                                                     3.91896305e+03, 2.25732352e+05, 8.39898390e-02, 9.30398309e-01,
                     -2.645459
                                         4.288170
                                                          1.642711
                                                                                     4.14006404e+01, 6.65491037e+04, 1.39452374e-03, 3.82218135e+00,
            Со
                     -1.275151
                                         3.133222
                                                          1.858071
                                                                                     1.64271099e+00, 1.85807112e+00, 1.26213069e+00])
                     -0.546888
                                         1.809018
                                                          1.262131
            N_0
```

 10^{4}

 10^{3}

 10^{4}