```
final simplex: (array([[6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                                                                    2.91002789e+03, 8.42408134e+04, 2.85277116e-02, 5.60092778e-01
                                                                                                                    9.92848444e+01, 6.76607902e+04, 1.42599003e-03, 3.60294044e+00,
                                                                                                                    3.67380245e+00, 1.08099376e+00, 1.27046896e+00],
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                                                                    2.91002788e+03, 8.42408134e+04, 2.85277116e-02, 5.60092777e-01,
                                                                                                                    9.92848444e+01, 6.76607902e+04, 1.42599003e-03, 3.60294044e+00,
                                                                                                                    3.67380245e+00, 1.08099376e+00, 1.27046896e+00],
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                                                                    2.91002789e+03, 8.42408135e+04, 2.85277116e-02, 5.60092778e-01,
                                                                                                                    9.92848441e+01, 6.76607902e+04, 1.42599003e-03, 3.60294044e+00,
                                                                                                                    3.67380245e+00, 1.08099376e+00, 1.27046896e+00],
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                                                                    2.91002789e+03, 8.42408134e+04, 2.85277116e-02, 5.60092778e-01,
                                                                                                                    9.92848446e+01, 6.76607901e+04, 1.42599003e-03, 3.60294044e+00,
                                                                                                                    3.67380245e+00, 1.08099376e+00, 1.27046896e+00],
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                                                                    2.91002789e+03, 8.42408134e+04, 2.85277116e-02, 5.60092778e-01,
                                                                                                                    9.92848442e+01, 6.76607902e+04, 1.42599003e-03, 3.60294044e+00,
                                                                                                                    3.67380245e+00, 1.08099376e+00, 1.27046896e+00],
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                                                                    2.91002788e+03, 8.42408134e+04, 2.85277116e-02, 5.60092777e-01,
               inducer -> sensor (GFP output)
                                                                                                                    2.91002789e+03, 8.42408134e+04Converged 16e-02, 5.60092778e-01,
                                                                                                                  9.92848443e+01, 6.7660790 e+0 Converged 3e-03, 3.60294044e+00, 3.67380245e+00, 1.0809937 e+0 Converged 5e+00], [6.63644254e+02, 1.6269960 e+0 Converged 5e+03, 1.17652351e+00,
                                                                                10^{4}
                                                                                                                    2_91002789e+03, 8.42408135e+04, 2.85277116e-02, 5.60092778e-01,
                                                                                                                    9.92848446e+01, 6.76607902e+04, 1.42599003e-03, 3.60294044e+00, 3.67380245e+00, 1.08099376e+00, 1.27046896e+00],
                                                                          6 \times 10^{3}
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                          4 \times 10^{3}
                                                                                                                    2.91002788e+03, 8.42408134e+04, 2.85277116e-02, 5.60092778e-01,
                                                                          3 \times 10^{3}
                                                                                                                    Q.92848443e+01, 6.76607901e+04, 1.42599003e-03, 3.60294044e+00,
                                                                                                                    3.6<del>7380245e+00, 1</del>.$099376e+00, 1.27046896e+00],
                                                                          2 \times 10^{3}
                                                                                                                   [6.63644254e+02.7.62699601e+04, 1.28844275e+03, 1.17652351e+00, 2.91002788e+03, 8.42408134e+04, 2.85277116e-02, 5.60092778e-01,
                    10^{-4}
                                   10^{-3}
                                                 10^{-2}
                                                                10^{-1}
                                                                                      10^{-5}
                                                                                                    10^{-4}
                                                                                                  Full circuใቲ ዓጼባር የሚኒስ የተመደመ በ 6.76607901e+04, 1.42599003e-03, 3.60294044e+00,
           inducer -> S -| Output (GFP)
                                                                                                                       <del>673802456+00, 1.</del>08099376e+00, 1.27046896e+00],
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                          6 \times 10^{3}
                                                                                                                    ♀.91002789e+03, 8.ቑ2408134e+04, 2.85277116e-02, 5.60092778e-01,
                                                                                                                    💁92848444e+01, 6.†6607901e+04, 1.42599003e-03, 3.60294044e+00,
                                                                                                                    3.6√380246e+00, 1.∮8099376e+00, 1.27046896e+00],
                                                                                                                    6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00, 2.91002788e ◆03, 8.42408135e+04, 2.85277117e-02, 5.60092777e-01,
                                                                          4 \times 10^3
                                                                                                                  9 92848441e+01, 6.76607902e+04, 1.42599003e-03, 3.60294044e+00, 3.67380245e+00, 1.08099376e+00, 1.27046896e+00], [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                          3 \times 10^{3}
                                                                                                                    2.91002789e+03, 8.42408135e+04, 2.85277117e-02, 5.60092778e-01,
                                                                                                                    <u>9.92848440e+01, 6</u>.76607902e+04, 1.42599003e-03, 3.60294045e+00,
10^{3}
                                                                                                                    \frac{2067380245e+00}{0}-08099376e+00, 1.27046896e+00],
     10^{-5}
                                   10^{-3}
                                                 10^{-2}
                                                                                      10^{-5}
                                                                                                    10^{-4}
                    10^{-4}
                                                                10^{-1}
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                                                                    2.91002788e+03, 8.42408134e+04, 2.85277117e-02, 5.60092777e-01,
                 Across all four plots:
                                                                                                                    9.92848444e+01, 6.76607902e+04, 1.42599003e-03, 3.60294044e+00,
                                                                                                                    3.67380245e+00, 1.08099376e+00, 1.27046896e+00],
                    RSS (converged)=0.039
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                                                                    2.91002788e+03, 8.42408134e+04, 2.85277116e-02, 5.60092778e-01,
                    RSS (initial) = 3.364
                                                                                                                    9.92848437e+01, 6.76607901e+04, 1.42599003e-03, 3.60294044e+00,
                                                                                                                    3.67380246e+00, 1.08099376e+00, 1.27046896e+00],
                    RSS (% reduction)=0.988
                                                                                                                   [6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                                                                                                                    2.91002789e+03, 8.42408135e+04, 2.85277116e-02, 5.60092778e-01,
                               epsilon Initial guesses Converged
                                                                                                                    9.92848444e+01, 6.76607902e+04, 1.42599003e-03, 3.60294044e+00,
                          55.247151
                                                    608.397103 663.644254
                                                                                                                    3.67380245e+00, 1.08099376e+00, 1.27046896e+00]]), array([0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392406, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392496, 0.0392406, 0.0392406, 0.0392406, 0.0392406, 0.0392406, 0.0392406, 0.0392406, 0.0392406, 0.0392406, 0.0392406, 0.000060606, 0.000060606, 0.
                B_s 1019.502445
                                                    15250.457700 16269.960145
                                                                                                                   0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.039239996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.03923996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.0392996, \, 0.039296, \, 0.039296, \, 0.039296, \, 0.039296, \, 0.039296, \, 0.039296, \, 0.039296, \, 0.039296, \, 0.00966, \, 0.00966, \, 0.00966, \, 0.00966
                C_s -379.616299
                                                     1668.059050 1288.442751
                                                                                                                   0.03923996, 0.03923996, 0.03923996, 0.03923996, 0.03923996,
                Νs
                           -0.022410
                                                     1.198934 1.176524
                                                                                                                   0.03923996]))
                                                      687.964693 2910.027888
                A r 2222.063195
                                                                                                                       fun: 0.039239962474635307
                Br 60743.202047
                                                     23497.611400 84240.813447
                                                                                                                   message: 'Optimization terminated successfully.'
                C_r
                          -0.033839
                                                     0.062367
                                                                           0.028528
                                                                                                                      nfev: 12061
                           0.168362
                                                     0.391731
                                                                           0.560093
                Νr
                                                                                                                       nit: 9050
                A h -491.321704
                                                      590.606548 99.284844
                                                                                                                    status: 0
                B h 32373.664482
                                                     35287.125700 67660.790182
                                                                                                                   success: True
                C h
                            0.000896
                                                      0.000530
                                                                            0.001426
                                                                                                                         x: array([6.63644254e+02, 1.62699601e+04, 1.28844275e+03, 1.17652351e+00,
                Αо
                            2.773111
                                                      0.829830
                                                                            3.602940
                                                                                                                   2.91002789e+03, 8.42408134e+04, 2.85277116e-02, 5.60092778e-01,
                           -0.614368
                                                      4.288170
                                                                            3.673802
                                                                                                                   9.92848444e+01, 6.76607902e+04, 1.42599003e-03, 3.60294044e+00,
                           -2.052228
                                                      3.133222
                                                                            1.080994
                                                                                                                   3.67380245e+00, 1.08099376e+00, 1.27046896e+00
                           -0.538550
                                                      1.809018
                                                                            1.270469
                N_o
```

 10^{4}

 10^{3}

 10^{4}