```
final simplex: (array([[6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                 4.22664905e+03, 1.03226611e+04, 1.38269668e-03, 1.20399991e+00,
                                                                 5.90442341e+02, 4.35128286e+04, 7.56699978e-04, 9.59018387e-02,
                                                                 1.11238690e+01, 2.77977889e+00, 1.60793153e+00],
                                                                 [6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                 4.22664905e+03, 1.03226611e+04, 1.38269668e-03, 1.20399991e+00,
                                                                 5.90442340e+02, 4.35128286e+04, 7.56699979e-04, 9.59018390e-02,
                                                                 1.11238689e+01, 2.77977889e+00, 1.60793153e+00],
                                                                 [6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                 4.22664905e+03, 1.03226611e+04, 1.38269668e-03, 1.20399991e+00,
                                                                 5.90442342e+02, 4.35128286e+04, 7.56699977e-04, 9.59018389e-02,
                                                                 1.11238690e+01, 2.77977889e+00, 1.60793153e+00],
                                                                 [6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                 4.22664905e+03, 1.03226611e+04, 1.38269668e-03, 1.20399991e+00,
                                                                 5.90442340e+02, 4.35128286e+04, 7.56699978e-04, 9.59018388e-02,
                                                                 1.11238689e+01, 2.77977889e+00, 1.60793153e+00],
                                                                 [6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                 4.22664905e+03, 1.03226611e+04, 1.38269668e-03, 1.20399991e+00,
                                                                 5.90442341e+02, 4.35128286e+04, 7.56699978e-04, 9.59018392e-02,
                                                                 1.11238690e+01, 2.77977889e+00, 1.60793153e+00],
                                                                 [6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                  4.22664905e+03, 1.03226611e+04, 1.38269668e-03, 1.20399991e+00,
        inducer -> sensor (GFP output)
                                             10^{4}
                                                                 4.22664905e+03, 1.0322661 -094 Converged 63e-03, 1.20399991e+00,
                                                                 5.90442341e+02, 4.3512828 e+04Converged 3e-04, 9.59018389e-02,
                                                                 1.11238689e+01, 2.77977889e+0
                                                                                                                3e+00],
                                                                 [6.37117881e+02, 1.67982910e+04, Converged 65e+03, 1.10031303e+00, 4.22664905e+03, 1.03226611e+04, 1.38269668e-03, 1.20399991e+00,
                                          6 \times 10^{3}
                                                                 5.90442941e+02, 4.35128286e+04, 7.56699979e-04, 9.59018390e-02, 1.11298689e+01, 2.77977889e+00, 1.60793153e+00],
                                          4 \times 10^{3}
                                                                 [6.37117881e+02, 1.$7982910e+04, 1.14246365e+03, 1.10031303e+00,
                                          3 \times 10^{3}
                                                                  4.22664905e+03, 1.\psi3226612e+04, 1.38269669e-03, 1.20399991e+00,
                                                                  5_90442340e+02, 4.$5128286e+04, 7.56699978e-04, 9.59018384e-02,
                                                                 1.11<del>238689e+01, 2</del>.†7977888e+00, 1.60793153e+00],
                                                                 \begin{array}{l} 6.37117881e+02.1.67982910e+04, \ 1.14246365e+03, \ 1.10031303e+00, \\ 4.022664905e+03, \ 1.03226611e+04, \ 1.38269669e-03, \ 1.20399991e+00, \\ \end{array}
                   10^{-3}
           10^{-4}
                           10^{-2}
                                    10^{-1}
                                                10^{-5}
                                                         10^{-4}
                                                       Full circu5t9\( 4.35128286e+04, 7.56699979e-04, 9.59018385e-02, \)
\( \frac{1.11238689e+01, 2.7}{2.7}7977889e+00, 1.60793153e+00 \],
      inducer -> S -| Output (GFP)
                                                                 [6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                  4.22664905e+03, 1.03226611e+04, 1.38269669e-03, 1.20399991e+00,
                                          6 \times 10^{3}
                                                                  590442341e+02, 4.$5128286e+04, 7.56699978e-04, 9.59018387e-02,
                                                                  1.11238689e+01, 2.77977889e+00, 1.60793153e+00],
                                                                 [6.3 117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                          4 \times 10^{3}
                                                                  4.22664905e+03, 1.$03226611e+04, 1.38269668e-03, 1.20399991e+00,
                                                                 5.90442341e+02, 4.35128286e+04, 7.56699978e-04, 9.59018389e-02, 1.1238690e+01, 2.77977889e+00, 1.60793153e+00], [6.3X117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                          3 \times 10^{3}
                                                                 4.22664905e+03, 1.03226612e+04, 1.38269669e-03, 1.20399990e+00,
                                                                  <u>5.90442341e+02,4</u>.35128286e+04, 7.56699978e-04, 9.59018382e-02,
10^{3}
                                                                 \frac{1}{10} 1.238 69 \frac{1}{10} \frac{1}{10} 2.77977889e+00, 1.60793153e+00],
                                                        10^{-4}
   10^{-5}
                   10<sup>-3</sup>
                            10^{-2}
                                                10^{-5}
           10^{-4}
                                    10^{-1}
                                                                 [6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                 4.22664905e+03, 1.03226611e+04, 1.38269669e-03, 1.20399991e+00,
         Across all four plots:
                                                                 5.90442341e+02, 4.35128286e+04, 7.56699978e-04, 9.59018385e-02,
                                                                 1.11238690e+01, 2.77977889e+00, 1.60793153e+00],
           RSS (converged)=0.059
                                                                 [6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                 4.22664905e+03, 1.03226611e+04, 1.38269669e-03, 1.20399991e+00,
           RSS (initial) = 1.693
                                                                  5.90442339e+02, 4.35128286e+04, 7.56699979e-04, 9.59018389e-02,
                                                                 1.11238689e+01, 2.77977889e+00, 1.60793153e+00],
           RSS (% reduction)=0.966
                                                                 [6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                 4.22664905e+03, 1.03226611e+04, 1.38269668e-03, 1.20399991e+00,
                 epsilon Initial guesses Converged
                                                                 5.90442341e+02, 4.35128286e+04, 7.56699979e-04, 9.59018389e-02,
              28.720778
                             608.397103 637.117881
                                                                 1.11238690e+01, 2.77977889e+00, 1.60793153e+00]]), array([0.05870802, 0.05870802, 0.05870802, 0.05870802, 0.05870802,
         B s 1547.833278
                             15250.457700 16798.290978
                                                                 0.05870802,\, 0.05870802,\, 0.05870802,\, 0.05870802,\, 0.05870802,
         C s -525.595398
                              1668.059050 1142.463652
                                                                 0.05870802, 0.05870802, 0.05870802, 0.05870802, 0.05870802,
               -0.098621
                              1.198934 1.100313
                                                                 0.05870802]))
         A_r 3538.684359
                              687.964693 4226.649052
                                                                   fun: 0.05870802304924743
         B r -13174.950265
                              23497.611400 10322.661135
                                                                 message: 'Optimization terminated successfully.'
         C_{r}
                              0.062367
               -0.060984
                                          0.001383
                                                                  nfev: 50702
               0.812269
                              0.391731
                                          1.204000
         Νr
                                                                   nit: 38750
               -0.164207
                             590.606548 590.442341
         Αh
                                                                 status: 0
         B h 8225.702878
                             35287.125700 43512.828578
                                                                 success: True
         C h
                0.000227
                              0.000530
                                           0.000757
                                                                    x: array([6.37117881e+02, 1.67982910e+04, 1.14246365e+03, 1.10031303e+00,
                                                                 4.22664905e+03, 1.03226611e+04, 1.38269668e-03, 1.20399991e+00,
         Αо
               -0.733928
                              0.829830
                                           0.095902
                6.835699
                              4.288170
                                          11.123869
                                                                 5.90442341e+02, 4.35128286e+04, 7.56699978e-04, 9.59018387e-02,
               -0.353443
                              3.133222
                                           2.779779
                                                                 1.11238690e+01, 2.77977889e+00, 1.60793153e+00])
               -0.201087
                              1.809018
                                           1.607932
         N_o
```

 10^{4}

 10^{3}

 10^{4}