```
final simplex: (array([[1.01798966e+03, 8.34570783e+03, 1.28216467e+03, 1.10571672e+00,
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                              6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847672e+00,
                                                                              6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                             [1.01798967e+03, 8.34570777e+03, 1.28216468e+03, 1.10571675e+00, 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                              6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847671e+00,
                                                                              6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                             [1.01798967e+03, 8.34570773e+03, 1.28216468e+03, 1.10571673e+00,
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                              6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847672e+00,
                                                                              6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                             [1.01798965e+03, 8.34570786e+03, 1.28216464e+03, 1.10571670e+00,
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                              \begin{array}{l} 6.83835638e+02,\ 3.24643802e+04,\ 4.73376905e-04,\ 2.41847672e+00,\\ 6.32148081e-01,\ 9.72768210e-01,\ 2.64017386e+00,\ 1.91933916e+00], \end{array}
                                                                             [1.01798967e+03, 8.34570791e+03, 1.28216462e+03, 1.10571672e+00,
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                              6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847672e+00,
                                                                              6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                             [1.01798967e+03, 8.34570777e+03, 1.28216468e+03, 1.10571674e+00,
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                              6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847672e+00,
                                                                              6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                             [1.01798966e+03, 8.34570780e+03, 1.28216465e+03, 1.10571672e+00,
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
6.83835638e+02, 3.2464380 e+0 Converged 5e-04, 2.41847671e+00, 6.32148081e-01, 9.72768210 e-01, Converged 5e+03, 1.10571672e+00, [1.01798967e+03, 8.8457078 e+0 Converged 5e+03, 1.10571672e+00,
                                            4 \times 10^{3}
                                                                              1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                              6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847671e+00, 6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                            3 \times 10^{3}
                                                                             [1.01798966e+03, 8.$4570779e+03, 1.28216466e+03, 1.10571672e+00,
                                                                              1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                               6.8383<del>5638e+02, 3</del>.24643802e+04, 4.73376905e-04, 2.41847670e+00,
                                                                              6.321<del>48081e 01, 9.</del>72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                             [<u>170</u>]798<u>968e+0378.</u>34570782e+03, 1.28216462e+03, 1.10571673e+00, 1.91617<del>3</del>61e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                      10<sup>-5</sup>
                                                                 10^{-4}
                                                                5 \times 10^{3}
                                                                             [1.01798966e+03, 8.\( \)4570783e+03, 1.28216464e+03, 1.10571672e+00,
                                                                              1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                             6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847670e+00,
                                            4 \times 10^{3}
                                                                              ┓32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                             1\9\dagged617561e+03, 1.\$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                            3 \times 10^{3}
                                                                            6.83895638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847673e+00, 6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00], [1.01398968e+03, 8.84570792e+03, 1.28216459e+03, 1.10571671e+00,
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                             \begin{array}{l} 6.83835638e \pm 07.3 \\ 24643802e \pm 04, 4.73376905e \pm 04, 2.41847672e \pm 00, \\ 6032148981e \pm 01.1972768210e \pm 01, 2.64017386e \pm 00, 1.91933916e \pm 00], \\ [1.01798965e \pm 03, 8.34570780e \pm 03, 1.28216461e \pm 03, 1.10571670e \pm 00, \\ \end{array}
                                                      10^{-5}
                                                                 10^{-4}
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                              6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847670e+00,
                                                                              6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                             [1.01798967e+03, 8.34570786e+03, 1.28216462e+03, 1.10571670e+00,
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                              6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847671e+00,
                                                                              6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00],
                                                                             [1.01798967e+03, 8.34570788e+03, 1.28216461e+03, 1.10571671e+00,
         epsilon Initial_guesses Converged
                                                                              1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                           618.047086 1017.989661
                                                                              6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847673e+00
                          16278.856600 8345.707833
                                                                              6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00]), array([0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03480
                          1300.653790 1282.164668
                                                                             0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596,
                           1.096541 1.105717
                                                                             0.03487596, 0.03487596, 0.03487596, 0.03487596, 0.03487596,
                        1916.175610 1916.175610
                                                                             0.03487596, 0.03487596]))
                       18874.240800 18874.240800
                                                                                fun: 0.034875962262783125
                                            0.009030
                                                                             message: 'Optimization terminated successfully.'
                                             0.820433
                                                                               nfev: 1272
                          683.835638 683.835638
                                                                                nit: 814
                        32464.380200 32464.380200
                                                                              status: 0
                                             0.000473
                                                                             success: True
                                             2.418477
                                                                                  x: array([1.01798966e+03, 8.34570783e+03, 1.28216467e+03, 1.10571672e+00,
                                             0.632148
                                                                             1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                             0.972768
                                                                             6.83835638e+02, 3.24643802e+04, 4.73376905e-04, 2.41847672e+00,
                                             2.640174
                                                                             6.32148081e-01, 9.72768210e-01, 2.64017386e+00, 1.91933916e+00])
```

inducer -> sensor (GFP output)

10⁻³

inducer -> S -| Output (GFP)

 10^{-3}

RSS (converged)=0.035

RSS (% reduction)=0.964

Across all four plots:

RSS (initial)=0.938

399.942575

-18.489122

0.009175

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

-0.402875

0.000000

0.000000

0.000000

0.000000

B s -7933.148767

 N_s

C r

Νr

Βh

C h

Fο

Αо

 B_o

Со

10-2

 10^{-2}

0.009030

0.820433

0.000473

2.821352

0.632148

0.972768

2.640174

1.919339

1.919339

 10^{-1}

 10^{-1}

 10^{4}

 10^{3}

 10^{4}

 10^{-5}

 10^{-4}

 10^{-4}