```
1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                                 2.03438139e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00,
                                                                                                                                 9.68142063e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                                 2.03438138e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00,
                                                                                                                                 9.68142064e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                                 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                                 2.03438138e+02, 4.60328741e+04, 1.09398409e-03, 1.06604687e+00,
                                                                                                                                 9.68142065e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                                 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                                 2.03438138e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00,
                                                                                                                                 9.68142061e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                                 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                                 2.03438137e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00,
                                                                                                                                 9.68142063e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                                 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                                 2.03438138e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00,
                                                                                                                                 9.68142065e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.09654125e+00]
                                                                                                                                 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
               ['SM data type data plots for mutation', 'Output3t'] 8e+02, 4.60328742 = +04, Initial Guess e+03, 1.06604687e+00, e+00, 1.45267787e+00], 1.4526778e+00], 1.452678e+00], 1.452678e+00], 1.4526778e+00], 1.4526778e+00], 1
  inducer -> sensor (GFP output)
                                                                                                                                 1.91617561e+03, 1.8874240 --+-4Converged 88e-03, 8.20433340e-01,
                                                                                                                                 2.03438138e+02, 4.60328742<u>e+0</u>4Converged 9e-03, 1.06604687e+00,
                                                                                                                                9.68142062e-01, 2.42935941 e+00, 2.42935941 e+00, 1.45267787e+00], [6.18047086e+02, 1.6278856 e+0 Converged 79e+03, 1.09654125e+00,
                                                                                 4 \times 10^{3}
                                                                                                                                 1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                                2.03438137e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00, 9.68142064e-01, 2.42935940e+00, 2.72381301e+00, 1.45267787e+00], 1.8047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.94617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01, 2.03438138e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00, 2.03438138e+02, 4.60328742e+04, 2.00388409e-03, 2.00388409e-03
                                                                                3 \times 10^{3}
                                                                                2 \times 10^{3}
                                                                                                                                  9.68142065e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                 [6<u>:18047086e+02;1.</u>62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.91617581e+03;1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                  10^{-3}
                                                   10-2
                                                                                              10<sup>-5</sup>
                10^{-4}
                                                                    10^{-1}
                                                                                                               10^{-4}
                                                                                                             Full circuit 0343813866602, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00, 9.681420666-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
       inducer -> S -| Output (GFP)
                                                                                                                                 [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                 4 \times 10^{3}
                                                                                                                                   1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01, 03438138e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00,
                                                                                3 \times 10^3
                                                                                                                                  9.88142064e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                 [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                                                                  1.91617561e+03, 1.$8742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                2 \times 10^{3}
                                                                                                                                 2.03438139e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00,
                                                                                                                                9.68142062e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00], [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                                  <u>2.03438137e+02, 9.6</u>0328742e+04, 1.09398409e-03, 1.06604687e+00,
                                                                                       10^{3}
                                                                                                                                 968142961e-01,1042935941e+00, 2.72381301e+00, 1.45267787e+00], [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                   10^{-2}
                10^{-4}
                                  10<sup>-3</sup>
                                                                     10^{-1}
                                                                                                               10^{-4}
10<sup>-5</sup>
                                                                                              10^{-5}
             Across all four plots:
                                                                                                                                 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                                                                                                 2.03438139e+02, 4.60328741e+04, 1.09398409e-03, 1.06604688e+00,
                 RSS (converged)=0.081
                                                                                                                                 9.68142060e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                 RSS (initial)=0.967
                                                                                                                                 2.03438136e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00,
                 RSS (% reduction)=0.923
                                                                                                                                 9.68142065e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00],
                                                                                                                                [6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00, 1.09654125e+00]
                              epsilon Initial_guesses
                                                                                Converged
                                                                                                                                 1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                                                     618.047086 618.047086
                          0.000000
                                                                                                                                 2.03438139e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00
            Вs
                          0.000000
                                                   16278.856600 16278.856600
                                                                                                                                 9.68142060e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00]), array([0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08060
                          0.000000
                                                    1300.653790 1300.653790
                                                                                                                                0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826,
                          0.000000
                                                        1.096541
            N_s
                                                                                  1.096541
                                                                                                                                0.08061826, 0.08061826, 0.08061826, 0.08061826, 0.08061826,
                         0.000000
                                                    1916.175610 1916.175610
                                                                                                                                0.08061826, 0.08061826]))
                                                  18874.240800 18874.240800
                         0.000000
                                                                                                                                     fun: 0.08061825902581492
                         0.000000
                                                        0.009030
                                                                                  0.009030
                                                                                                                                message: 'Optimization terminated successfully.'
                                                                                  0.820433
            Νr
                         0.000000
                                                        0.820433
                                                                                                                                    nfev: 3049
                       -480.397499
                                                        683.835638 203.438139
                                                                                                                                     nit: 2133
                                                        32464.380200 46032.874162
                     13568.493962
            Βh
                                                                                                                                 status: 0
                          0.000621
                                                        0.000473
                                                                                  0.001094
                                                                                                                                success: True
                         -1.755305
                                                        2.821352
                                                                                  1.066047
            Fο
                                                                                                                                        x: array([6.18047086e+02, 1.62788566e+04, 1.30065379e+03, 1.09654125e+00,
                                                                                  0.968142
                          0.335994
                                                        0.632148
                                                                                                                                1.91617561e+03, 1.88742408e+04, 9.03017988e-03, 8.20433340e-01,
                          1.456591
                                                        0.972768
                                                                                  2.429359
                                                                                                                                2.03438139e+02, 4.60328742e+04, 1.09398409e-03, 1.06604687e+00,
            Во
                          0.083639
                                                        2.640174
                                                                                   2.723813
                                                                                                                                9.68142063e-01, 2.42935941e+00, 2.72381301e+00, 1.45267787e+00])
            C o
                          -0.466661
                                                         1.919339
                                                                                  1.452678
```

 $10^{4}$ 

 $10^{3}$ 

 $10^{4}$ 

 $10^{3}$