Deepank Agrawal
17CS30011   Assignment 3

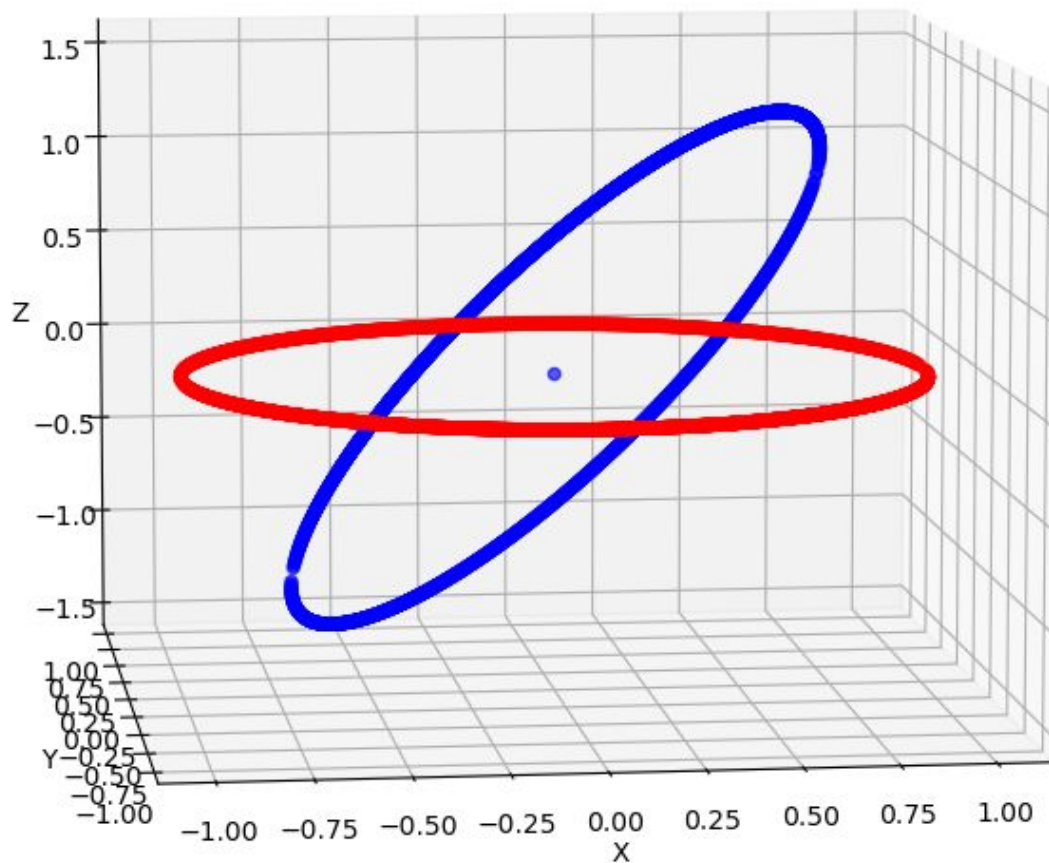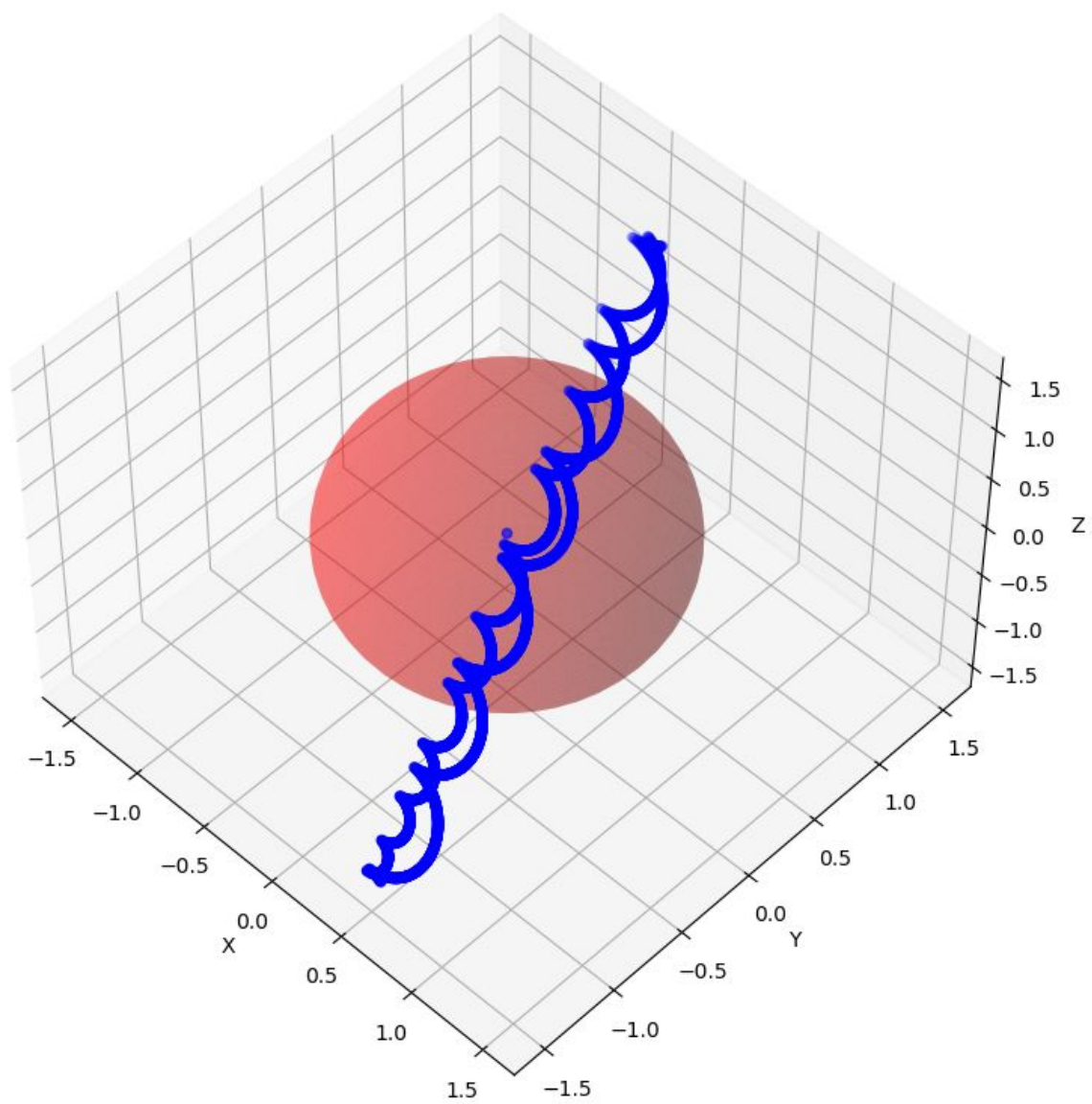9. In the plots, red - original, blue - transformed
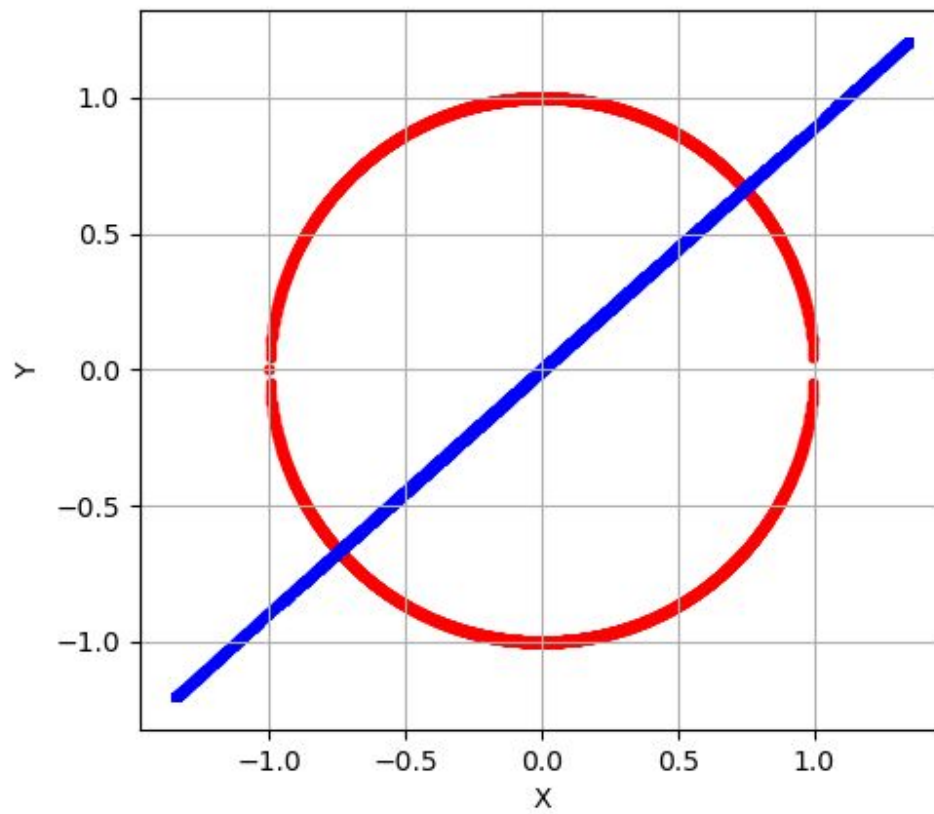
(a)

Condition number: 2.23606797749979

(b)

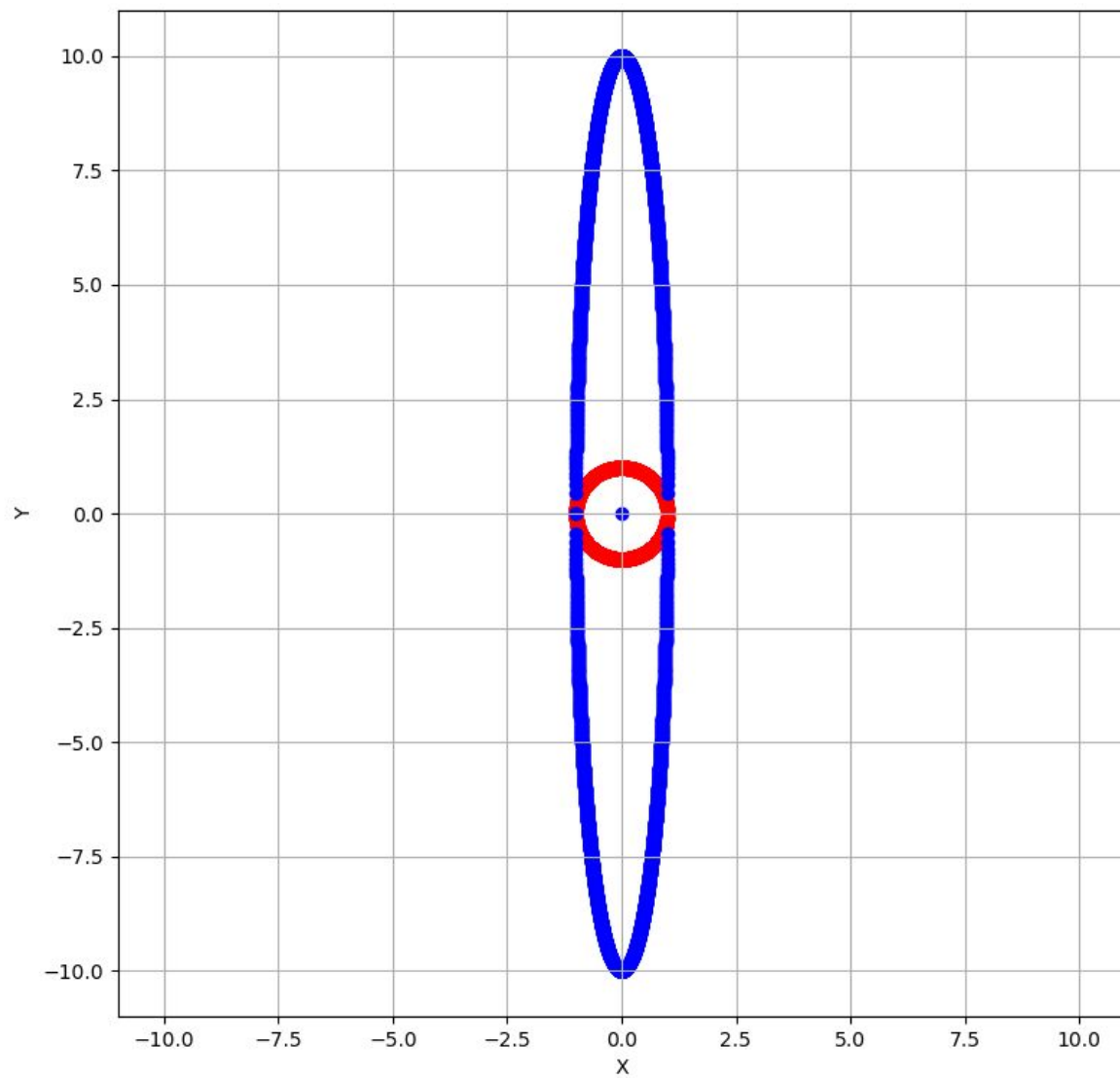Condition number: 1.715010090561728

(c)

Condition number: 325.99693248647975
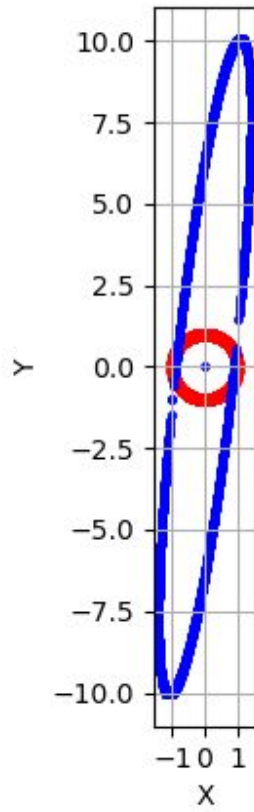Invertible
Determinant: -0.009999999999999995

(d)

Condition number: 10.0
Invertible
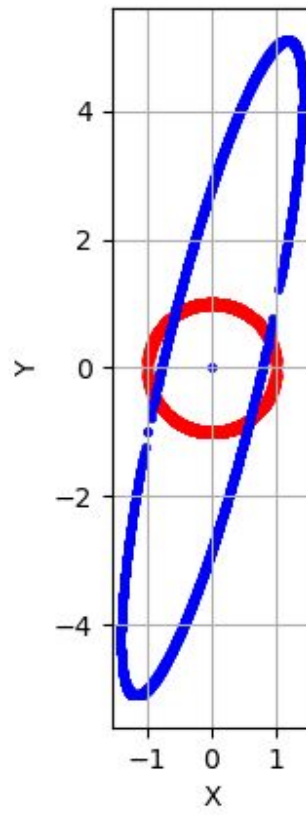Determinant: -10.000000000000002

(e)

$\varepsilon = 10$

Condition number: 11.35638827945676
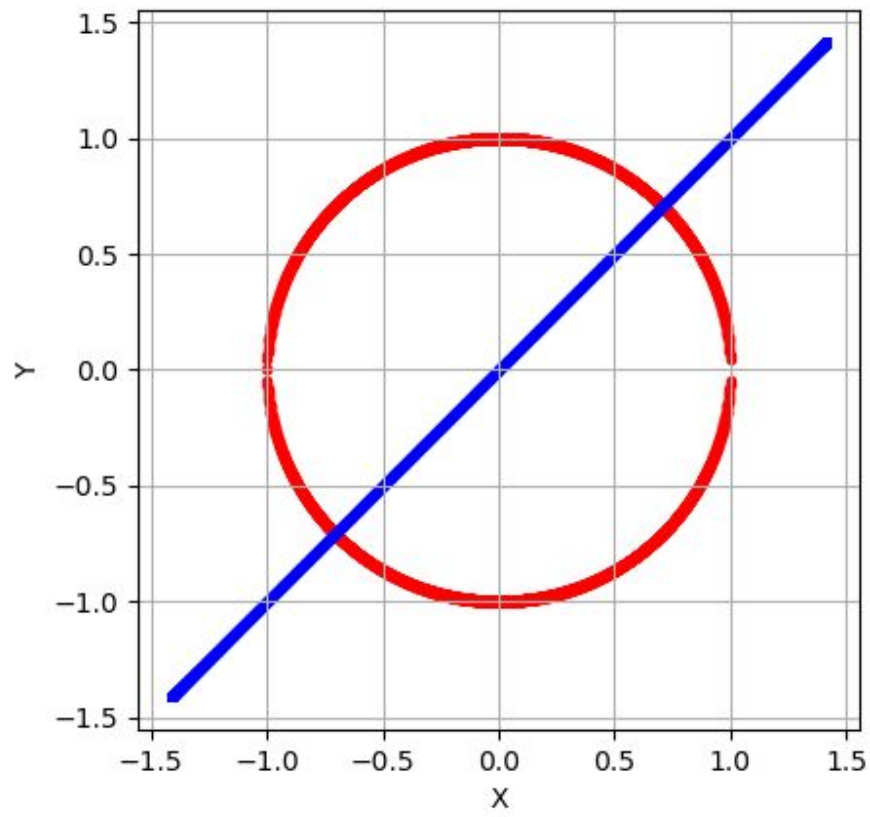Invertible
Determinant: 9.000000000000002

ε = 5

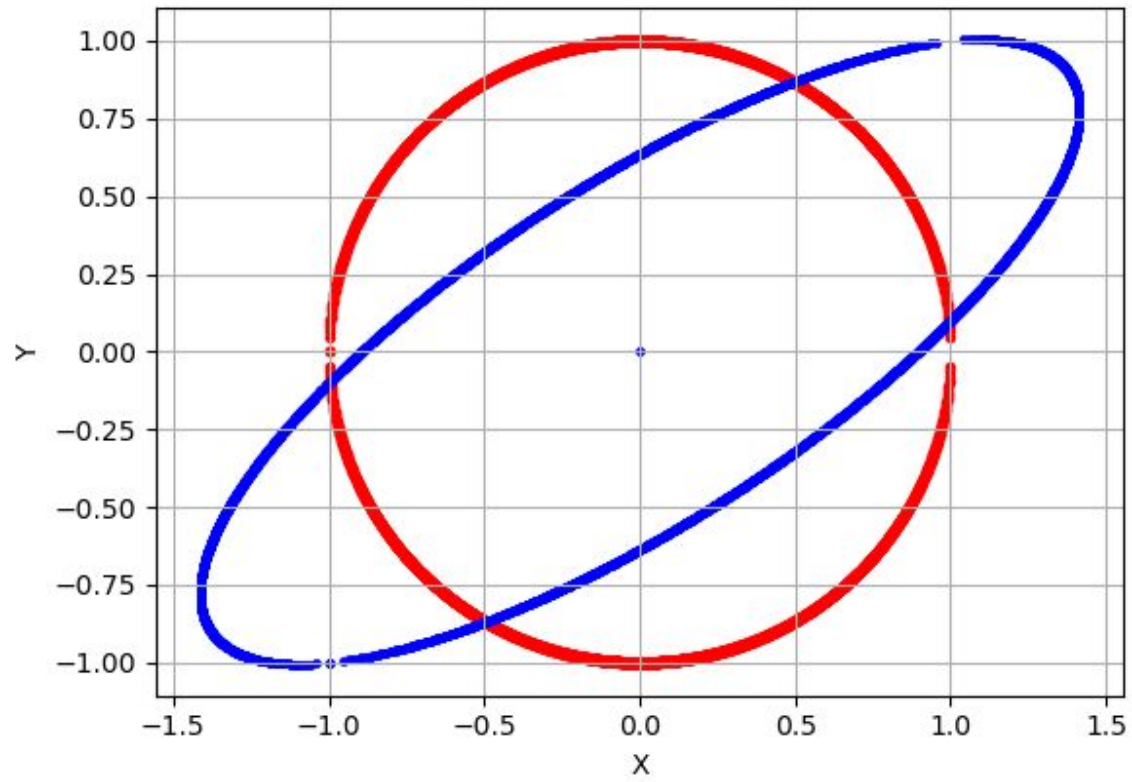Condition number: 6.854101966249685
Invertible
Determinant: 4.0

ε = 1

Condition number: 5.961777047638983e+16
Not Invertible

$\varepsilon = 10^{-1}$

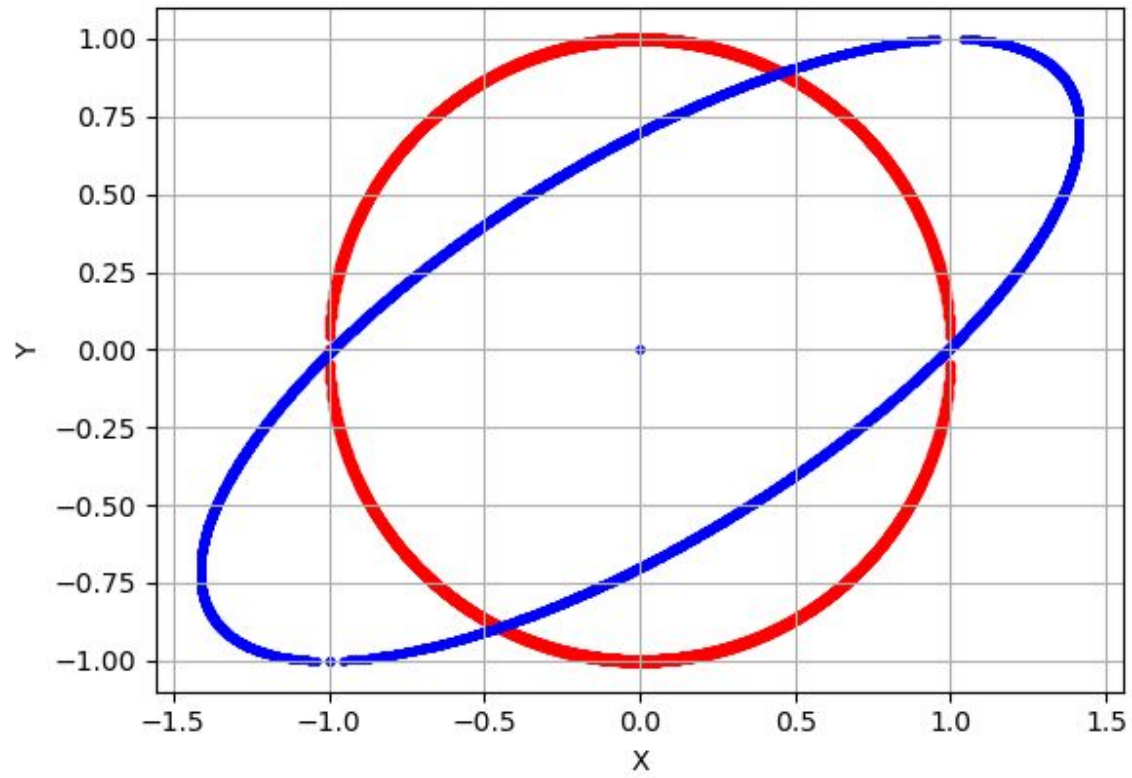

Condition number: 3.0124935233004138
Invertible
Determinant: -0.9

$\varepsilon = 10^{-2}$

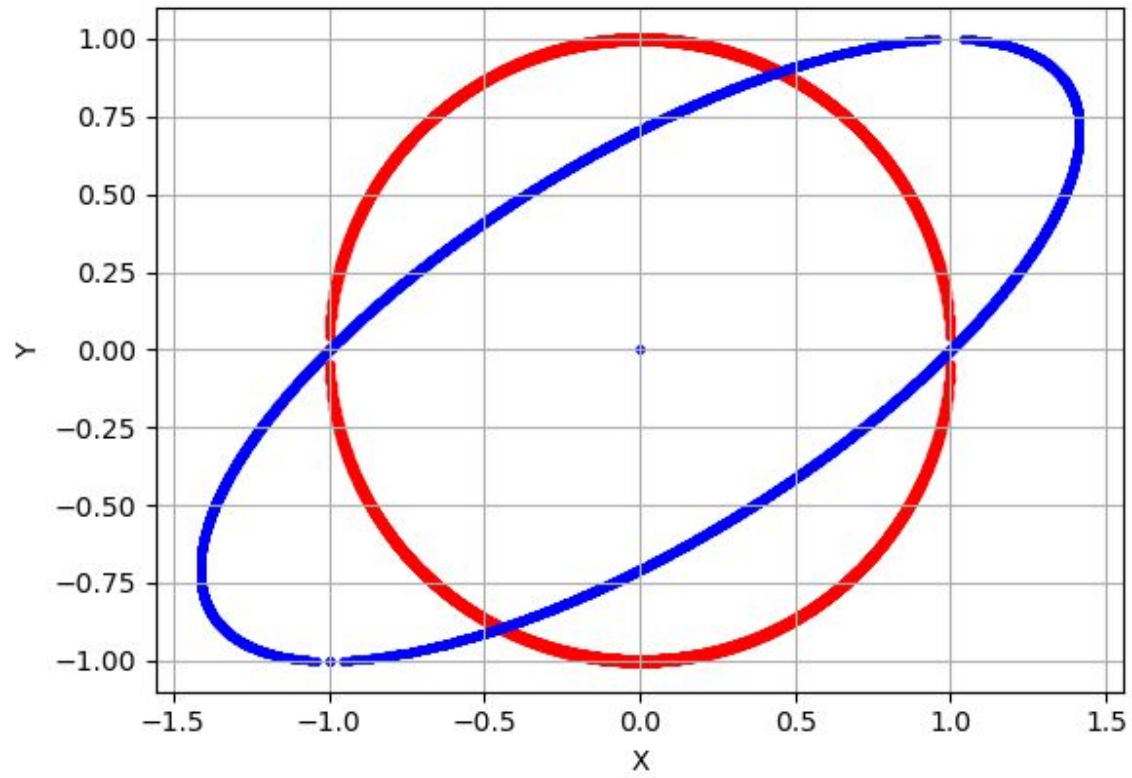
Condition number: 2.6535504563252843
Invertible
Determinant: -0.99

$\varepsilon = 10^{-4}$

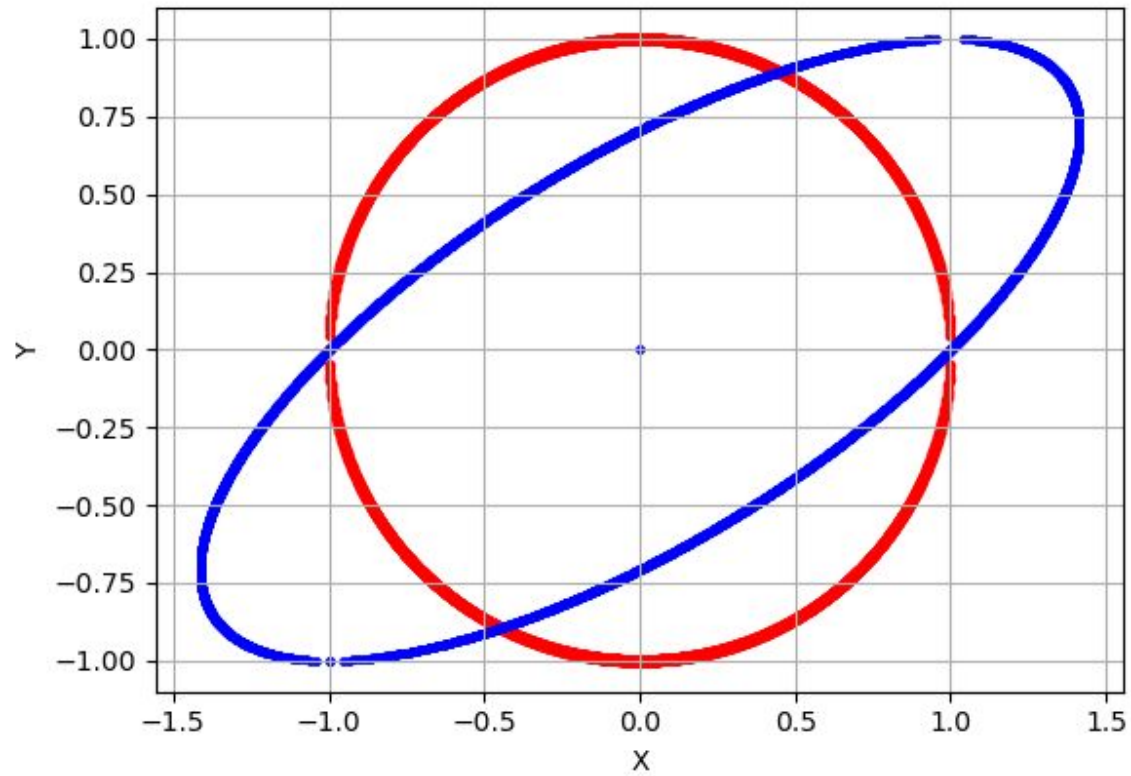Condition number: 2.618385273654826
Invertible
Determinant: -0.9999

$\varepsilon = 0$

Condition number: 2.6180339887498953
Invertible
Determinant: -1.0

As evident from the condition numbers and determinant values, we can say that as condition number becomes larger, determinant approaches 0, i.e., the matrix becomes singular.