Step-1

Consider the matrix:

$$A = \begin{bmatrix} .3 & .3 & .2 \\ .3 & .2 & .4 \\ .2 & .2 & .1 \end{bmatrix}$$

For first row,

$$\begin{aligned} \lambda_1 &= |.3| + |.3\ | + |.2| \\ &= 0.8 \end{aligned}$$

For first row,

$$\begin{aligned} \lambda_2 &= |.3| + |.2\ | + |.4| \\ &= .9 \end{aligned}$$

For first row,

$$\begin{aligned} \lambda_3 &= |.2\ | + |.2| + |.1| \\ &= .5 \end{aligned}$$

Therefore, we get,

$$\lambda_{\max} = .9$$

Consider another matrix:

$$A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

For first row,

$$\begin{aligned} \lambda_1 &= |2| + |-1| + |0| \\ &= 3 \end{aligned}$$

For first row,

$$\begin{aligned} \lambda_2 &= |-1| + |2\ | + |-1| \\ &= 4 \end{aligned}$$

For first row,

$$\begin{aligned} \lambda_3 &= |0| + |-1| + |2| \\ &= 3 \end{aligned}$$

Therefore, we get,

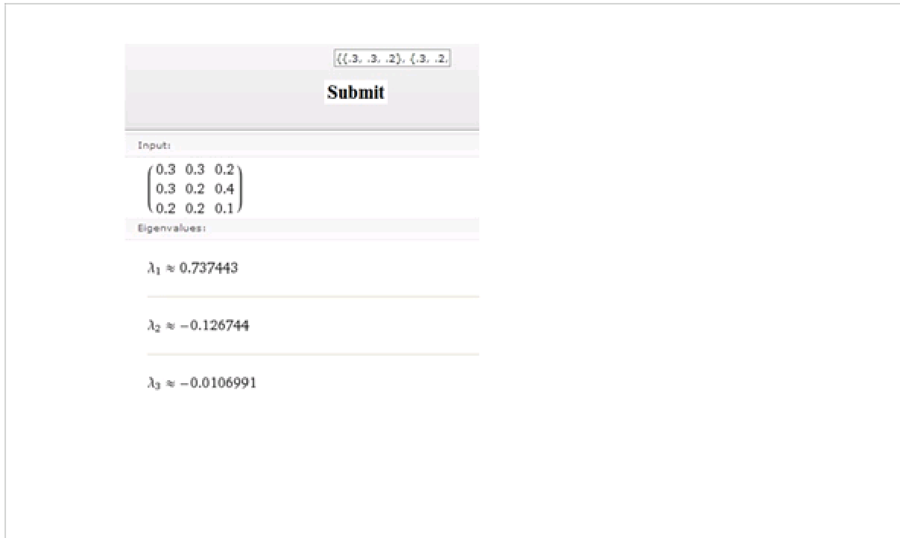
$\lambda_{\max} = 4$

Step-2

Consider the matrix:

$$A = \begin{bmatrix} .3 & .3 & .2 \\ .3 & .2 & .4 \\ .2 & .2 & .1 \end{bmatrix}$$

By using matrix calculator (the screenshot is given below), the eigenvalues of A are given by,



Step-3

The circles that bound the Eigenvalues are C_1, C_2, and C_3.

The center of C_1 is at the point (.3, 0).

Step-4

The radius of C_1 is given by,

$$\begin{aligned} r_1 &= |.3| + |.2| \\ &= .5 \end{aligned}$$

The center of C_2 is at the point (.2, 0).

The radius of C_2 is given by,

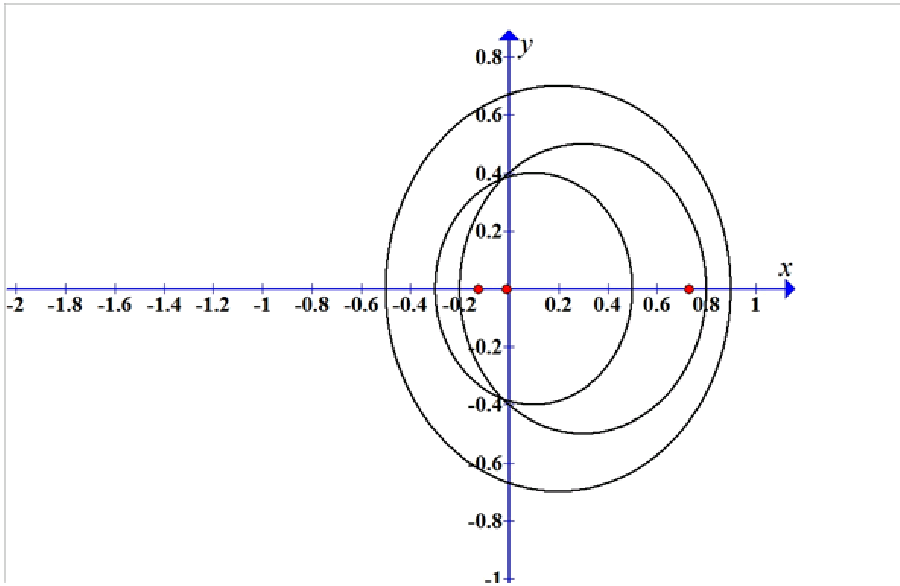
$$\begin{aligned} r_2 &= |.3| + |.4| \\ &= .7 \end{aligned}$$

The center of C_3 is at the point (.1, 0).

The radius of C_3 is given by,

$$\begin{aligned} r_3 &= |.2| + |.2| \\ &= .4 \end{aligned}$$

The graph of circles C_1, C_2, and C_3 is given below.

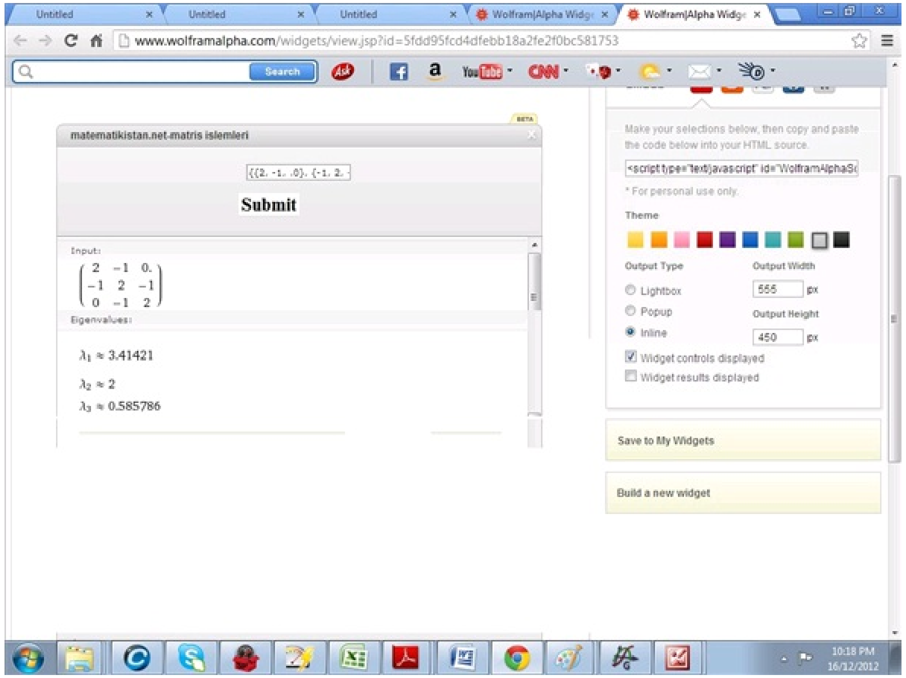


Step-5

Consider the second matrix:

$$A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

By using matrix calculator (the screenshot is given below), the eigenvalues of A are given by,



The Gershgorin circles that bound the Eigenvalues are C_1, C_2, and C_3.

The center of C_1 is at the point (2, 0).

The radius of C_1 is given by,

$$\begin{aligned} r_1 &= |-1| + |0| \\ &= 1 \end{aligned}$$

The center of C_2 is at the point (2, 0).

The radius of C_2 is given by,

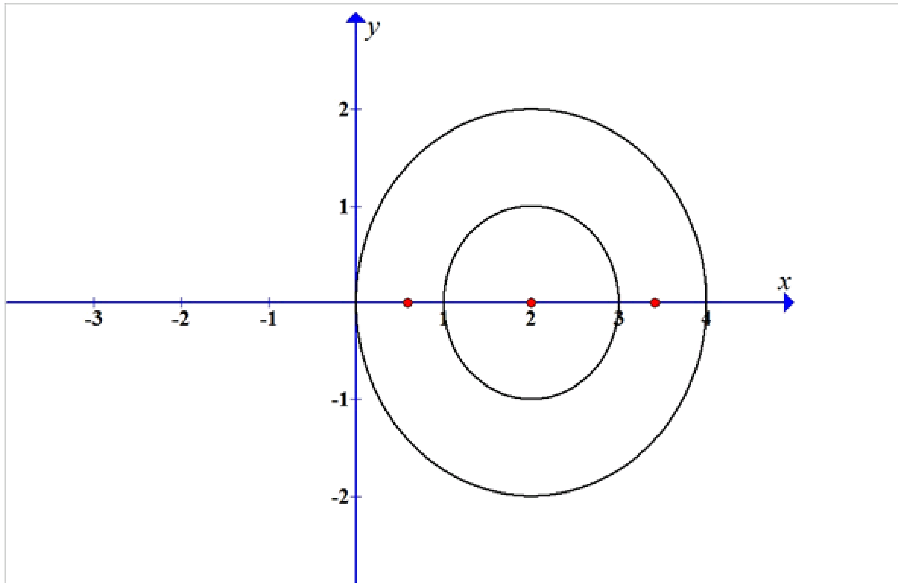
$$\begin{aligned} r_2 &= |-1| + |-1| \\ &= 2 \end{aligned}$$

The center of C_3 is at the point (2, 0).

The radius of C_3 is given by,

$$\begin{aligned} r_3 &= |0| + |1| \\ &= 1 \end{aligned}$$

The graph of Gershgorin circles C_1, C_2, and C_3 is given below.



y
x
2
1
-1
-2
-3
-2
-1
1
2
3
4