

Console

The transformed vectors are :

0.6  
0.2

- 0.4  
1.2

- 0.6  
- 0.2

0.4  
- 1.2

These points lie on the ellipse:

$$\frac{(x-3)^2 + (3x+y)^2}{16} = 4$$

The vector  $(0, 2/\sqrt{10})$  lies on the circle:

$$x^2 + y^2 = 4$$

- 0.1897367  
1.2016655

Also lies on the same ellipse

We can see that there is a linear relationship between the first 4 vectors and their respective transformed vectors through the scalars known as eigenvectors and eigenvalues respectively