

Euler's Theorem Homework

1. Consider a matrix rotating about the z-axis using coordinate transformation matrix,

$$\begin{bmatrix} \cos \theta & \sin \theta & 0 \\ -\sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{bmatrix} \text{ with } \theta = 1.0 \text{ rad} .$$

Use matlab to find the eigenvalues of the CTM. Is one of them 1.0?

Find the normalized eigenvector associated with the eigenvalue of 1.0.

What is the axis of rotation?

2. Consider a matrix rotating about an arbitrary axis whose CTM is given at some instant in time as

$$\begin{bmatrix} 0.671 & 0.479 & -.565 \\ -.367 & 0.878 & .309 \\ 0.644 & 0 & 0.765 \end{bmatrix} . \text{ Find the normalized eigenvector associated with the eigenvalue of 1.0.}$$

This is your axis of rotation.