1 Eigenvectors of the Rotation Matrix

The orthogonal matrix

$$R_z(\theta) = \begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

corresponds to a rotation around the z-axis by the angle θ.

(a) Find the eigenvalues of this matrix.

(b) Find the normalized eigenvectors of this matrix.

(c) Describe how the eigenvectors do or do not correspond to the vectors which are held constant or "only stretched" by this transformation.