

Section 5.1: Cont'd

Wednesday, November 21, 2018 11:28 AM

Reminder: Test #3 on Friday, Nov 30

- covers Complex Numbers, Chapter 4, and sections 5.1 to 5.3, inclusive
- if you need the projection operator and/or the rotation matrix, I will give it/them to you

property: the eigenvalues of an orthogonal matrix Q satisfy:

$$|\lambda| = 1$$

proof: $Q\vec{x} = \lambda\vec{x}$

$$\|Q\vec{x}\| = |\lambda| \|\vec{x}\|$$

$$\|\vec{x}\| = |\lambda| \|\vec{x}\|$$

$$\therefore |\lambda| = 1$$

example: show that the matrix $A = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ satisfies

$$|\lambda| = 1.$$

find eigenvalues for A :

$$\det(A - \lambda I) = 0$$

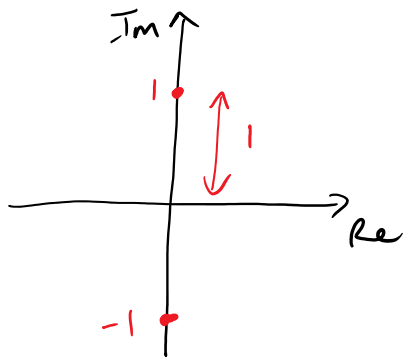
$$\begin{vmatrix} -\lambda & -1 \\ 1 & -\lambda \end{vmatrix} = 0$$

$$\lambda^2 + 1 = 0$$

$$\lambda^2 = -1$$

$$\lambda = \pm i$$

$$|\lambda| = 1$$



note: the absolute value of a complex number is the distance from the origin