

Quiz 9 MATH 7504 Spring 2019

$$A = \begin{pmatrix} 2 & 1 \\ 4 & 2 \end{pmatrix}$$

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

$$\det \begin{pmatrix} 2-\lambda & 1 \\ 4 & 2-\lambda \end{pmatrix} = 0$$

$$(2-\lambda)^2 - 4 = 0$$

$$4 - 4\lambda + \lambda^2 - 4 = 0$$

$$\lambda^2 - 4\lambda = 0$$

$$\lambda(\lambda - 4) = 0$$

↙ ↘
 $\lambda = 0$ $\lambda = 4$

↓
class

e-vector:

$$(A - 4I)\vec{v} = \vec{0}$$

$$\begin{pmatrix} -2 & 1 \\ 4 & -2 \end{pmatrix} \begin{pmatrix} v_1 \\ v_2 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

$$\rightarrow -2v_1 + v_2 = 0$$

$$\rightarrow v_2 = 2v_1$$

$$\Rightarrow \vec{v} = \begin{pmatrix} v_1 \\ v_2 \end{pmatrix} = \begin{pmatrix} v_1 \\ 2v_1 \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \end{pmatrix} v_1$$

$$\Rightarrow \text{eigenpair is } \lambda = 4, \vec{v} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$