

## Quiz 9

- 1) (a) true, multiples of eig'vec are eig'vec  
 (b) false,  $\lambda_1 + \lambda_2$  need not be eig'vec  
 (c) true, eig'vec are orthogonal for  $A$  symm  
 (d) false, eig'vec are nonzero  
 (e) true, always for matrices  $\rightarrow$  book  
 (f) true, since lin' indep'

$$2) \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}^T \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 1 \\ 1 & 2 \end{pmatrix} \rightarrow (\lambda-1)(\lambda-2) - 1 = 0$$

$$\lambda^2 - 3\lambda + 1 = 0 \quad \lambda = \frac{3}{2} \pm \sqrt{\frac{5}{4}}$$

$$\text{sig val } d_j = \sqrt{\frac{3 \pm \sqrt{5}}{2}}$$

3) eig'val  $-2$  double

$$\text{eig'vec } \begin{pmatrix} 2 \\ -5 \end{pmatrix}$$

$$\begin{array}{ccc} 1 & 4 & 2 \\ -2 & -10 & -8 \\ 0 & 0 & 0 \end{array}$$

$$\begin{pmatrix} -1 \\ 2 \end{pmatrix} \text{ gen' eig'vec}$$

$$S = \begin{pmatrix} 2 & -1 \\ -5 & 2 \end{pmatrix}$$