

1. Verify that $\lambda_1 = -1$, $\mathbf{v}_1 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and $\lambda_2 = 2$, $\mathbf{v}_2 = \begin{bmatrix} 5 \\ 2 \end{bmatrix}$ are eigenpairs for

$$\begin{bmatrix} 4 & -5 \\ 2 & -3 \end{bmatrix}$$

2. Find the eigenpairs for $\begin{bmatrix} 6 & -3 \\ -2 & 1 \end{bmatrix}$.

$$(\text{answer: } \lambda_1 = 0, \mathbf{v}_1 = t \begin{bmatrix} 1 \\ 2 \end{bmatrix} \text{ and } \lambda_2 = 7, \mathbf{v}_2 = t \begin{bmatrix} 3 \\ -1 \end{bmatrix})$$

3. Find the eigenpairs for $\begin{bmatrix} 1 & -3/2 \\ 1/2 & -1 \end{bmatrix}$.

$$(\text{answer: } \lambda_1 = -1/2, \mathbf{v}_1 = t \begin{bmatrix} 1 \\ 1 \end{bmatrix} \text{ and } \lambda_2 = 1/2, \mathbf{v}_2 = t \begin{bmatrix} 3 \\ 1 \end{bmatrix})$$

4. Find the eigenpairs for $\begin{bmatrix} 2 & -2 & 3 \\ 0 & 3 & -2 \\ 0 & -1 & 2 \end{bmatrix}$.

$$(\text{answer: } \lambda_1 = 4, \mathbf{v}_1 = t \begin{bmatrix} 7 \\ -4 \\ 2 \end{bmatrix}, \lambda_2 = 2, \mathbf{v}_2 = t \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \text{ and } \lambda_3 = 1, \mathbf{v}_3 = t \begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix})$$

5. Find the eigenpairs for $\begin{bmatrix} 0 & -3 & 5 \\ -4 & 4 & -10 \\ 0 & 0 & 4 \end{bmatrix}$.

$$(\text{answer: } \lambda_1 = -2, \mathbf{v}_1 = t \begin{bmatrix} 3 \\ 2 \\ 0 \end{bmatrix}, \lambda_2 = 4, \mathbf{v}_2 = t \begin{bmatrix} 5 \\ -10 \\ -2 \end{bmatrix} \text{ and } \lambda_3 = 6, \mathbf{v}_3 = t \begin{bmatrix} 1 \\ -2 \\ 0 \end{bmatrix})$$