

## §3.2 (PART 2): EIGENVALUES, EIGENVALUES, AND IVPs

- 1.] Verify that  $\lambda_1 = 3$  and  $\mathbf{v}_1 = \begin{bmatrix} 6 \\ -2 \end{bmatrix}$ , and  $\lambda_2 = 1$  and  $\mathbf{v}_2 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$  make up two eigenvalue/eigenvector pairs for the matrix  $A = \begin{bmatrix} 4 & 3 \\ -1 & 0 \end{bmatrix}$ .

- 2.] Compute the eigenvalues and eigenvectors of the matrix  $A = \begin{bmatrix} -3 & 1 \\ -1 & 1 \end{bmatrix}$ .

3.] Solve the following initial-value problem

$$\frac{d\mathbf{y}}{dt} = \begin{bmatrix} 3 & 0 \\ 1 & -2 \end{bmatrix} \mathbf{y}, \quad \mathbf{y}(0) = \begin{bmatrix} 2 \\ 2 \end{bmatrix}.$$