

§3.2 (PART 1): EIGENVALUES AND EIGENVECTORS

1.] A linear system and its vector field are presented below:

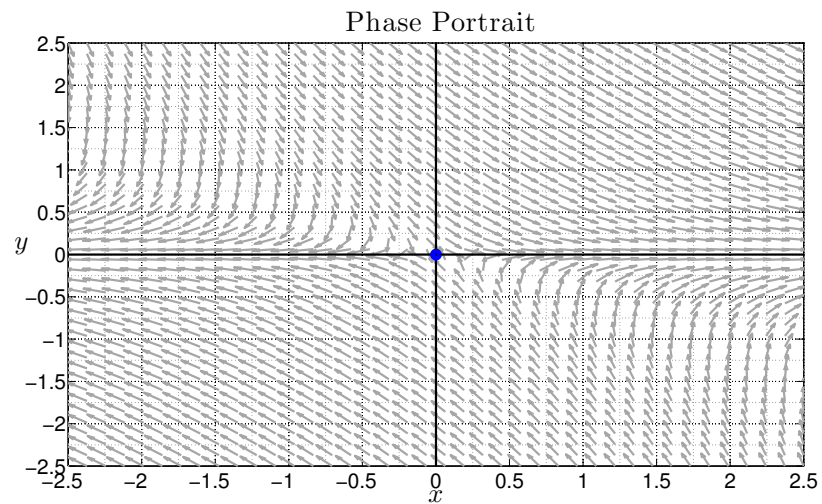
Linear system:

$$\frac{d\mathbf{y}}{dt} = \begin{bmatrix} 2 & 3 \\ 0 & -4 \end{bmatrix} \mathbf{y}$$

Solutions from previous worksheet:

$$\mathbf{y}_1(t) = \begin{bmatrix} e^{2t} \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \end{bmatrix} e^{2t}$$

$$\mathbf{y}_2(t) = \begin{bmatrix} -e^{-4t} \\ 2e^{-4t} \end{bmatrix} = \begin{bmatrix} -1 \\ 2 \end{bmatrix} e^{-4t}$$



Find the eigenvalues and eigenvectors of the matrix above and use them to construct the general solution to the system.

2.] Find the general solution to the harmonic oscillator:

$$\frac{d^2y}{dt^2} + 7\frac{dy}{dt} + 10y = 0.$$