

1. Find the general solution of the system.

(a)  $\mathbf{x}'(t) = \begin{pmatrix} 3 & -2 \\ 4 & -1 \end{pmatrix} \mathbf{x}$

$$(b) \mathbf{x}'(t) = \begin{pmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{pmatrix} \mathbf{x}.$$

$$(c) \mathbf{x}'(t) = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & -2 \\ 3 & 2 & 1 \end{pmatrix} \mathbf{x}.$$

$$(d) \mathbf{x}'(t) = \begin{pmatrix} 5 & 2 & 4 \\ 2 & 2 & 2 \\ 4 & 2 & 5 \end{pmatrix} \mathbf{x}.$$

2. Find the solution of the initial value problem.

$$(a) \mathbf{x}'(t) = \begin{pmatrix} 5 & -1 \\ 3 & 1 \end{pmatrix} \mathbf{x}, \quad \mathbf{x}(0) = \begin{pmatrix} 2 \\ -1 \end{pmatrix}.$$

$$(b) \mathbf{x}'(t) = \begin{pmatrix} 3 & -4 \\ 4 & -5 \end{pmatrix} \mathbf{x} \quad \mathbf{x}(0) = \begin{pmatrix} 3 \\ -1 \end{pmatrix}.$$

$$(c) \mathbf{x}'(t) = \begin{pmatrix} -3 & 2 \\ -1 & -1 \end{pmatrix} \mathbf{x}, \quad \mathbf{x}(0) = \begin{pmatrix} 1 \\ 1 \end{pmatrix}.$$