

1. Determine the general solution to the system of DE: $\vec{x}' = A\vec{x}(t)$

a) $A = \begin{bmatrix} -3 & -2 \\ 2 & 1 \end{bmatrix}$

b) $A = \begin{bmatrix} -2 & 0 & 0 \\ 1 & -3 & -1 \\ -1 & 1 & -1 \end{bmatrix}$

c) $A = \begin{bmatrix} 6 & -8 \\ 2 & -2 \end{bmatrix}$

d)
$$\begin{bmatrix} 3 & 1 & 0 \\ -1 & 5 & 0 \\ 0 & 0 & 4 \end{bmatrix}$$

2. Solve the following IVP: $\vec{x}' = A\vec{x}(t)$ subject to $\vec{x}(0) = \vec{x}_0$

a) $A = \begin{bmatrix} -2 & -1 \\ 1 & -4 \end{bmatrix}; \vec{x}_0 = \begin{bmatrix} 0 \\ -1 \end{bmatrix}$

$$\text{b)} \quad A = \begin{bmatrix} -2 & -1 & 4 \\ 0 & -1 & 0 \\ -1 & -3 & 2 \end{bmatrix}; \overrightarrow{x_0} = \begin{bmatrix} -2 \\ 1 \\ 1 \end{bmatrix}$$