

Ex 1

Solve

$$x' = Ax + \begin{pmatrix} 4 \\ 3 \end{pmatrix}$$

$$A = \begin{bmatrix} 1 & -7 \\ 1 & 9 \end{bmatrix}$$

$$x_c = c_1 e^{2t} \begin{bmatrix} -1 \\ 1 \end{bmatrix} + c_2 e^{2t} \begin{bmatrix} -7 \\ 1 \end{bmatrix}$$

guess

$$x_p = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix}$$

Eq.

$$x_p' = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \quad \begin{pmatrix} 0 \\ 0 \end{pmatrix} = A \begin{pmatrix} a_1 \\ a_2 \end{pmatrix} + \begin{pmatrix} 4 \\ 3 \end{pmatrix}$$

$$\left[ \begin{array}{cc|c} 1 & -7 & -4 \\ 1 & 9 & -3 \end{array} \right] \sim \left[ \begin{array}{cc|c} 1 & 0 & -57/16 \\ 0 & 1 & 1/16 \end{array} \right]$$

$$a_1 = -57/16 \quad a_2 = 1/16$$

$$x = x_c + x_p$$