

1. Solve the system  $Y' = AY$  where  $A = \begin{bmatrix} 2 & 1 \\ -4 & 2 \end{bmatrix}$  and  $Y = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$ .

2. Solve the system  $Y' = AY$  where  $A = \begin{bmatrix} -1 & 0 & 1 \\ 0 & -1 & 1 \\ 1 & -1 & -1 \end{bmatrix}$ , given that  $A$  has eigenvalue  $\lambda = -1$  with multiplicity 3.