

M146 Sample 08 For Thurs May 18, 2006

(1) Let $A = \begin{bmatrix} -3 & 0 \\ 4 & 2 \end{bmatrix}$

(1b) Find the eigenvalues and eigenvectors for the matrix A .

(1c) Find the general solution to the system $x' = AX$.

(1d) Find the solution to the system for which $x_1(0) = -5$, $x_2(0) = -5$.

(2a) $A = \begin{bmatrix} 1 & 5 \\ -1 & 7 \end{bmatrix}$ Find two solutions to $Av = \lambda v$ where v is a vector and λ is a scalar.

(2b) Find the general solution to the system $x' = AX$.

(2c) Find the solution to the system for which $x_1(0) = 6$, $x_2(0) = 14$.

(3a) $A = \begin{bmatrix} -.2 & .2 \\ .3 & -.1 \end{bmatrix}$ Find two solutions to $Av = \lambda v$ where v is a vector and λ is a scalar.

(3b) Find the general solution to the system $x' = AX$.

(3c) Find the solution to the system for which $x_1(0) = 10$, $x_2(0) = 0$.

(4a) $A = \begin{bmatrix} 3 & 2 & 2 \\ 1 & 4 & 1 \\ -2 & -4 & -1 \end{bmatrix}$ The three eigenvalues are $\lambda_1 = 1$, $\lambda_2 = 2$, $\lambda_3 = 3$, Find three solutions to $Av = \lambda v$ where v is a vector and λ is a scalar.

(4b) Find the general solution to the system $x' = AX$.

(4c) Find the solution to the system for which $x_1(0) = -5$, $x_2(0) = -1$, $x_3(0) = 2$.