

WebAssign

CH 8.4 (Homework)

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MA 265 Spring 2013, section 132, Spring 2013
Instructor: Alexandre Eremenko

Current Score : 20 / 20 **Due :** Thursday, April 25 2013 11:40 PM EDT

The due date for this assignment is past. Your work can be viewed below, but no changes can be made.

Important! Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may *not* grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

[Request Extension](#) [View Key](#)

1. 3.33/3.33 points | [Previous Answers](#)

KolmanLinAlg9 8.4.001.

Consider the linear system of differential equations

$$\begin{bmatrix} x'_1 \\ x'_2 \\ x'_3 \end{bmatrix} = \begin{bmatrix} -4 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}.$$

(a) Find the general solution. (Enter each vector in the form $[x_1, x_2, \dots]$. Use b_1, b_2, \dots for any arbitrary constants.)

$\mathbf{x}(t) =$



(b) Find the solution to the initial value problem determined by the initial conditions $x_1(0) = 5, x_2(0) = 2, x_3(0) = 3$. (Enter each vector in the form $[x_1, x_2, \dots]$.)

$\mathbf{x}(t) =$



2. 3.33/3.33 points | [Previous Answers](#)

KolmanLinAlg9 8.4.002.

Consider the linear system of differential equations

$$\begin{bmatrix} x'_1 \\ x'_2 \\ x'_3 \end{bmatrix} = \begin{bmatrix} 4 & 0 & 0 \\ 0 & -2 & 1 \\ 0 & 0 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}.$$

(a) Find the general solution. (Enter each vector in the form $[x_1, x_2, \dots]$. Use b_1, b_2, \dots for any arbitrary constants.)

$\mathbf{x}(t) =$



(b) Find the solution to the initial value problem determined by the initial conditions $x_1(0) = 5$, $x_2(0) = 7$, $x_3(0) = 20$. (Enter each vector in the form $[x_1, x_2, \dots]$.)

$\mathbf{x}(t) =$

3. 3.33/3.33 points | [Previous Answers](#)

KolmanLinAlg9 8.4.005.

Find the general solution to the linear system of differential equations. (Enter each vector in the form $[x_1, x_2, \dots]$. Use b_1, b_2, \dots for any arbitrary constants.)

$$\begin{bmatrix} x'_1 \\ x'_2 \\ x'_3 \end{bmatrix} = \begin{bmatrix} 2 & 0 & 0 \\ 0 & -4 & -3 \\ 0 & -3 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

$\mathbf{x}(t) =$

4. 3.33/3.33 points | [Previous Answers](#)

KolmanLinAlg9 8.4.006.

Find the general solution to the linear system of differential equations. (Enter each vector in the form $[x_1, x_2, \dots]$. Use b_1, b_2, \dots for any arbitrary constants.)

$$\begin{bmatrix} x'_1 \\ x'_2 \end{bmatrix} = \begin{bmatrix} -5 & 3 \\ 3 & -5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

$\mathbf{x}(t) =$



5. 3.33/3.33 points | [Previous Answers](#)

KolmanLinAlg9 8.4.007.

Find the general solution to the linear system of differential equations. (Enter each vector in the form $[x_1, x_2, \dots]$. Use b_1, b_2, \dots for any arbitrary constants.)

$$\begin{bmatrix} x'_1 \\ x'_2 \\ x'_3 \end{bmatrix} = \begin{bmatrix} -8 & -8 & 5 \\ 0 & -8 & 8 \\ 0 & 8 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

$\mathbf{x}(t) =$

6. 3.35/3.35 points | [Previous Answers](#)

KolmanLinAlg9 8.4.010.

Suppose that we have a system consisting of two interconnected tanks, each containing a brine solution. Tank A contains $x(t)$ pounds of salt in 200 gallons of brine, and tank B contains $y(t)$ pounds of salt in 300 gallons of brine. The mixture in each tank is kept uniform by constant stirring. When $t = 0$, brine is pumped from tank A to tank B at 20 gallons/minute and from tank B to tank A at 20 gallons/minute. Find the amount of salt in each tank at time t if $x(0) = 10$ and $y(0) = 40$.

$x(t) =$



$y(t) =$

