Web**Assign**CH 6.1 (Homework)

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

Current Score : 18.75 / 20 **Due :** Thursday, April 11 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. 1.25/2.5 points | Previous Answers

KolmanLinAlg9 6.1.001.

Which of the following functions are linear transformations?

(a)
$$L: R_2 \rightarrow R_3$$
 defined by

$$L([u_1 \quad u_2]) = [u_1 + 4 \quad u_2 \quad u_1 + u_2]$$

- linear transformation
- not a linear transformation



(b)
$$L: R_2 \rightarrow R_3$$
 defined by

$$L([u_1 \quad u_2]) = [u_1 + u_2 \quad u_2 \quad u_1 - u_2]$$

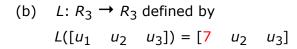
- linear transformation
- not a linear transformation



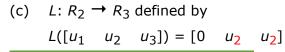
KolmanLinAlg9 6.1.002.

Which of the following functions are linear transformations?

- (a) $L: R_3 \to R_3$ defined by
 - $L([u_1 \quad u_2 \quad u_3]) = \begin{bmatrix} u_1 & 2u_2 + 2u_3 & 2u_3 \end{bmatrix}$
 - linear transformation
 - not a linear transformation



- linear transformation
- not a linear transformation



- linear transformation
- not a linear transformation

KolmanLinAlg9 6.1.007.

Find the standard matrix representing each given linear transformation.

(a)
$$L: \mathbb{R}^2 \to \mathbb{R}^2$$
 defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \end{bmatrix}\right) = \begin{bmatrix} u_1 \\ -u_2 \end{bmatrix}$

0 -1



(b)
$$L: \mathbb{R}^2 \to \mathbb{R}^2$$
 defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \end{bmatrix}\right) = \begin{bmatrix} u_2 \\ -u_1 \end{bmatrix}$

0	1
-1	0



(c)
$$L: R^3 \to R^3$$
 defined by $L \begin{pmatrix} u_1 \\ u_2 \\ u_3 \end{pmatrix} = \begin{bmatrix} u_1 \\ 0 \\ 0 \end{bmatrix}$

	/	
1	0	0
0	0	0
0	0	0

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4. 2.5/2.5 points | Previous Answers

KolmanLinAlg9 6.1.010.

Find the standard matrix representing each given linear transformation. (Use r for any needed variable.)

1	0	0
0	1	0



(b) Dilation mapping R^3 into R^3

r	0	0
0	r	0
0	0	r



(c) Reflection with respect to the y-axis mapping R^2 into R^2

-1	0
0	1

KolmanLinAlg9 6.1.011.

Find the standard matrix representing each given linear transformation.

(a)
$$L: \mathbb{R}^2 \to \mathbb{R}^2$$
 defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \end{bmatrix}\right) = \begin{bmatrix} u_2 \\ u_1 \end{bmatrix}$

 0
 1

 1
 0

1

(b)
$$L: R^2 \to R^3$$
 defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \end{bmatrix}\right) = \begin{bmatrix} u_1 - 2u_2 \\ 5u_1 - u_2 \\ 4u_2 \end{bmatrix}$

 1
 -2

 5
 -1

 0
 4

4

(c)
$$L: R^3 \to R^3$$
 defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \\ u_3 \end{bmatrix}\right) = \begin{bmatrix} u_1 + 4u_2 \\ -u_2 \\ u_2 + u_3 \end{bmatrix}$

 1
 4
 0

 0
 -1
 0

 0
 1
 1

KolmanLinAlg9 6.1.012.

Let $A = \begin{bmatrix} 10 & -3 & -6 \\ -3 & 1 & 2 \\ -9 & 3 & 7 \end{bmatrix}$ be the standard matrix representing the linear transformation $L: R^3 \to R^3$.

(a) Find
$$L\left(\begin{bmatrix} 2\\ -3\\ 1 \end{bmatrix}\right)$$
.

	\L	1]/
23		
-7		



(b) Find
$$L\left(\begin{bmatrix} u \\ v \\ w \end{bmatrix}\right)$$
.



KolmanLinAlg9 6.1.013.

Let $L: \mathbb{R}^3 \to \mathbb{R}^2$ be a linear transformation for which we know that

$$L\left(\left[\begin{array}{c}1\\0\\0\end{array}\right]\right) = \left[\begin{array}{c}4\\0\end{array}\right], \quad L\left(\left[\begin{array}{c}0\\1\\0\end{array}\right]\right) = \left[\begin{array}{c}-1\\-2\end{array}\right], \quad L\left(\left[\begin{array}{c}0\\0\\1\end{array}\right]\right) = \left[\begin{array}{c}3\\5\end{array}\right].$$

(a) What is $L\left(\begin{bmatrix} 1\\ -2\\ 3 \end{bmatrix}\right)$?

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4

(b) What is $L\left(\begin{bmatrix} u \\ v \\ w \end{bmatrix}\right)$?



8. 2.5/2.5 points | Previous Answers

KolmanLinAlg9 6.1.014.

Let $L: R_2 \rightarrow R_2$ be a linear transformation for which we know that

$$L\left(\left[\begin{array}{cc} 1 & 1 \end{array}\right]\right) = \left[\begin{array}{cc} -1 & 2 \end{array}\right],$$

$$L\left(\left[\begin{array}{cc} -1 & 1 \end{array}\right]\right) = \left[\begin{array}{cc} 4 & 3 \end{array}\right].$$

(a) What is $L(\begin{bmatrix} -1 & 5 \end{bmatrix})$?

10

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(b) What is $L([u \ v])$?

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