WebAssign
CH 4.5 (Homework)

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

Current Score : 14.3 / 20 **Due :** Thursday, February 28 2013 11:40 PM EST

---

1. 0/2.85 points | Previous Answers KolmanLinAlg9 4.5.004.

Determine whether

$$S = \{[2 \quad 1 \quad 3], [2 \quad 3 \quad -1], [6 \quad 1 \quad -7]\}$$

is a linear independent set in R_3.

- ○ Yes
- ◉ No ✗

---

2. 2.85/2.85 points | Previous Answers KolmanLinAlg9 4.5.005.

The given augmented matrix is derived from the equation

$$\sum_{j=1}^{k} a_j \mathbf{v}_j = a_1\mathbf{v}_1 + a_2\mathbf{v}_2 + \cdots + a_k\mathbf{v}_k = \mathbf{0}.$$

$$\left[\begin{array}{cccc|c} 43 & 21 & -6 & -6 & 0 \\ 14 & 7 & -2 & -2 & 0 \\ -6 & -3 & 1 & 1 & 0 \\ 18 & 9 & -3 & -2 & 0 \end{array}\right]$$

Is the set $S = \{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_k\}$ linearly independent?

- ◉ Yes ✓
- ○ No

3. 0/2.85 points | Previous Answers KolmanLinAlg9 4.5.006.

The given augmented matrix is derived from the equation

$$\sum_{j=1}^{k} a_j \mathbf{v}_j = a_1\mathbf{v}_1 + a_2\mathbf{v}_2 + \cdots + a_k\mathbf{v}_k = \mathbf{0}.$$

$$\left[\begin{array}{cccc|c} 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & -2 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

Is the set $S = \{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_k\}$ linearly independent?

- (•) Yes
- ( ) No

✗

4. 2.85/2.85 points | Previous Answers KolmanLinAlg9 4.5.011.

Which of the given vectors in R_3 are linearly dependent? For those which are, express one vector as a linear combination of the rest. (If a vector is linearly independent, enter INDEPENDENT in the answer blank. Otherwise, refer to the vectors using x, y, z, and w, as they are labeled.)

(a) $\overset{x}{\begin{bmatrix} 1 & 1 & 0 \end{bmatrix}}, \overset{y}{\begin{bmatrix} 0 & 4 & 2 \end{bmatrix}}, \overset{z}{\begin{bmatrix} 1 & 2 & 3 \end{bmatrix}}, \overset{w}{\begin{bmatrix} 3 & 4 & 3 \end{bmatrix}}$

✓

(b) $\overset{x}{\begin{bmatrix} 1 & 1 & 0 \end{bmatrix}}, \overset{y}{\begin{bmatrix} 2 & 4 & 4 \end{bmatrix}}$

✓

(c) $\overset{x}{\begin{bmatrix} 1 & 1 & 0 \end{bmatrix}}, \overset{y}{\begin{bmatrix} 0 & 4 & 2 \end{bmatrix}}, \overset{z}{\begin{bmatrix} 1 & 2 & 3 \end{bmatrix}}, \overset{w}{\begin{bmatrix} 0 & 0 & 0 \end{bmatrix}}$

✓

5. 2.85/2.85 points | Previous Answers KolmanLinAlg9 4.5.012.

Which of the given vectors in M_{22} are linearly dependent? For those which are, express one vector as a linear combination of the rest. (If a vector is linearly independent, enter INDEPENDENT in the answer blank. Otherwise, refer to the vectors using x, y, z, and w, as they are labeled.)

(a) $\overset{x}{\begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}}, \overset{y}{\begin{bmatrix} 3 & 0 \\ 0 & 4 \end{bmatrix}}, \overset{z}{\begin{bmatrix} 2 & 4 \\ 3 & 1 \end{bmatrix}}, \overset{w}{\begin{bmatrix} 5 & 7 \\ 9 & 4 \end{bmatrix}}$

(b) $\overset{x}{\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}}, \overset{y}{\begin{bmatrix} 3 & 0 \\ 0 & 4 \end{bmatrix}}, \overset{z}{\begin{bmatrix} 0 & 1 \\ 0 & 2 \end{bmatrix}}$

(c) $\overset{x}{\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}}, \overset{y}{\begin{bmatrix} 4 & 3 \\ 3 & 4 \end{bmatrix}}, \overset{z}{\begin{bmatrix} 3 & 3 \\ 4 & 3 \end{bmatrix}}, \overset{w}{\begin{bmatrix} 2 & 2 \\ 1 & 1 \end{bmatrix}}$

6. 2.85/2.85 points | Previous Answers KolmanLinAlg9 4.5.015.

Which of the given vectors in R^3 are linearly dependent? For those which are, express one vector as a linear combination of the rest. (If a vector is linearly independent, enter INDEPENDENT in the answer blank. Otherwise, refer to the vectors using x, y, z, and w, as they are labeled.)

(a) $x = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$, $y = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$, $z = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$

(b) $x = \begin{bmatrix} 1 \\ 1 \\ -1 \end{bmatrix}$, $y = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$, $z = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$, $w = \begin{bmatrix} -1 \\ -2 \\ -4 \end{bmatrix}$

(c) $x = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$, $y = \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix}$, $z = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}$

7. 2.9/2.9 points | Previous Answers KolmanLinAlg9 4.5.016.

For what value(s) of c are the vectors $[1 \quad 0 \quad 1]$, $[4 \quad 1 \quad 4]$, and $[5 \quad 1 \quad c]$ in R_3 linearly dependent? (Enter your answers as a comma-separated list.)

$c =$