Algebra Lineare - Esercizi del 16/10/08

Dati $v, w_1, \dots, w_n \in V$ stabilire se $v \in \mathrm{Span}(w_1, \dots, w_n)$

(1) $V = \mathbb{R}^2$, $v = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$, $w_1 = \begin{pmatrix} -\sqrt{3} \\ +\sqrt{7} \end{pmatrix}$

(2) $V = \mathbb{R}^2$, $v = \begin{pmatrix} \pi \\ 1 \end{pmatrix}$, $w_1 = \begin{pmatrix} 2 \\ -7 \end{pmatrix}$, $w_2 = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$

(3) $V = \mathbb{R}^2$, $v = \begin{pmatrix} \pi \\ e \end{pmatrix}$, $w_1 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$, $w_2 = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$

(4) $V = \mathbb{R}^2$, $v = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$, $w_1 = \begin{pmatrix} -5 \\ \pi \end{pmatrix}$, $w_2 = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$, $w_3 = \begin{pmatrix} 1 \\ -3 \end{pmatrix}$

(5) $V = \mathbb{R}^3$, $v = \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix}$, $w_1 = \begin{pmatrix} 5 \\ -2 \\ 3 \end{pmatrix}$

(6) $V = \mathbb{R}^3$, $v = \begin{pmatrix} 0 \\ -1 \\ 4 \end{pmatrix}$, $w_1 = \begin{pmatrix} 1 \\ 2 \\ 5 \end{pmatrix}$, $w_2 = \begin{pmatrix} 1 \\ -1 \\ -2 \end{pmatrix}$

(7) $V = \mathbb{R}^3$, $v = \begin{pmatrix} 1 \\ -1 \\ 4 \end{pmatrix}$, $w_1 = \begin{pmatrix} 2 \\ 1 \\ 0 \end{pmatrix}$, $w_2 = \begin{pmatrix} -1 \\ 3 \\ 2 \end{pmatrix}$

(8) $V = \mathbb{R}^3$, $v = \begin{pmatrix} 0 \\ 1 \\ -2 \end{pmatrix}$, $w_1 = \begin{pmatrix} 2 \\ 1 \\ 0 \end{pmatrix}$, $w_2 = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}$, $w_3 = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$

(9) $V = \mathbb{R}^3$, $v = \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}$, $w_1 = \begin{pmatrix} 1 \\ 2 \\ 1 \end{pmatrix}$, $w_2 = \begin{pmatrix} 0 \\ 1 \\ -1 \end{pmatrix}$, $w_3 = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$

$w_4 = \begin{pmatrix} -1 \\ 2 \\ 0 \end{pmatrix}$

(10) $V = \mathbb{R}[x]$, $v = 1 - x^2$, $w_1 = 1 + x^3$, $w_2 = x^2 - x^3$

(11) $V = \mathbb{R}[x]$ $\quad v = 1 - 2x + x^2$

$w_1 = 1 - x \quad w_2 = 1 + x - x^2 \quad w_3 = 2 + 3x^2$

(12) $V = \mathbb{R}[x]$ $\quad v = x^4$

$w_1 = 1 - x^3 \quad w_2 = x - 2x^4 \quad w_3 = x^2 + x^3$

(13) $V = \mathbb{R}[x]$, $\quad v = 2x$

$w_1 = 2 - x + x^3 \quad w_2 = 1 + 2x^3$

$w_3 = x + 3x^3 \quad w_4 = 1 - x$

(14) $V = M_{2\times2}(\mathbb{R})$ $\quad v = \begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix}$

$w_1 = \begin{pmatrix} 1 & 0 \\ -1 & 0 \end{pmatrix} \quad w_2 = \begin{pmatrix} 0 & 1 \\ 1 & 2 \end{pmatrix} \quad w_3 = \begin{pmatrix} 0 & \sqrt{3} \\ 0 & 0 \end{pmatrix}$

(15) $V = M_{2\times2}(\mathbb{R})$ $\quad v = \begin{pmatrix} 1 & 0 \\ 1 & -1 \end{pmatrix}$

$w_1 = \begin{pmatrix} -3 & 0 \\ 1 & 4 \end{pmatrix} \quad w_2 = \begin{pmatrix} 1 & 0 \\ -2 & -2 \end{pmatrix} \quad w_3 = \begin{pmatrix} -1 & 0 \\ -3 & 0 \end{pmatrix}$

Stabilire quali dei sistemi di vettori $(w_1, \dots, w_n)$ precedenti siano lin. indip.