Exercises

Given $\boldsymbol{a} = [-2,1,0,2,3,-1]$ and $\boldsymbol{b} = [4,2,-1,2,0,1]$, find $3\boldsymbol{a} - \boldsymbol{b}$ and the scalar projection of $\boldsymbol{a}$ on $\boldsymbol{b}$.

Exercises

Find the parametric equations of the line in $\mathbb{R}^5$ passing through the point $P(2,-4,1,0,-1)$ and is parallel to the line,

$$r = [5,3,-2,1,1] + t[3,1,4,-2,2]$$

Exercises

Determine the equation of the plane passing through the point $P(5,3,-1,1,2)$ and is parallel to the plane,

$$4x_1 + x_2 - 2x_3 + 2x_4 - x_5 = -2$$

Exercises

Show that the set of vectors in $\mathbb{R}^3$ where the second component is twice the first, and the third component is three times the first (i.e., $[a, 2a, 3a]$) is a subspace of $\mathbb{R}^3$.

Exercises

Let U denote all vectors in $\mathbb{R}^3$ of the form $[a, a^2, b]$. Show that U is not a subspace of $\mathbb{R}^3$.

Exercises

Let W denote all vectors in $\mathbb{R}^3$ such that their first component is negative. Show that W is not a subspace of $\mathbb{R}^3$.

Exercises

Let $\boldsymbol{v}_1 = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$, $\boldsymbol{v}_2 = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$ and $\boldsymbol{v}_3 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \in \mathbb{R}^3$. Show that $\boldsymbol{w} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ is a linear combination of v_1, v_2 and v_3.

Exercises

Decide whether the set $\{\boldsymbol{v}_1, \boldsymbol{v}_2\}$ is l.i. or l.d., where $\boldsymbol{v}_1 = \begin{bmatrix} -3 \\ 4 \end{bmatrix}$ and $\boldsymbol{v}_2 = \begin{bmatrix} 6 \\ -12 \end{bmatrix}$.

Exercises

Decide whether the set $\{\boldsymbol{v}_1, \boldsymbol{v}_2, \boldsymbol{v}_3\}$ is l.i. or l.d., where $\boldsymbol{v}_1 = \begin{bmatrix} -3 \\ 4 \end{bmatrix}$, $\boldsymbol{v}_2 = \begin{bmatrix} 6 \\ -12 \end{bmatrix}$ and $\boldsymbol{v}_3 = \begin{bmatrix} 3 \\ 5 \end{bmatrix}$.

Exercises

Decide whether the set $\{\boldsymbol{v}_1, \boldsymbol{v}_2, \boldsymbol{v}_3\}$ is l.i. or l.d., where $\boldsymbol{v}_1 = \begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}$, $\boldsymbol{v}_2 = \begin{bmatrix} 0 \\ 4 \\ -4 \end{bmatrix}$ and $\boldsymbol{v}_3 = \begin{bmatrix} -6 \\ 2 \\ 1 \end{bmatrix}$.

Exercises

Decide whether the set $\{\boldsymbol{v}_1, \boldsymbol{v}_2, \boldsymbol{v}_3\}$ is l.i. or l.d., where $\boldsymbol{v}_1 = \begin{bmatrix} 1 \\ -2 \\ 3 \\ 0 \end{bmatrix}$,

$\boldsymbol{v}_2 = \begin{bmatrix} -1 \\ 4 \\ 1 \\ -2 \end{bmatrix}$ and $\boldsymbol{v}_3 = \begin{bmatrix} 0 \\ 3 \\ -1 \\ 2 \end{bmatrix}$.