

Geometria e Algebra I

Esercizi del 29/11/07

(1) Stabilire la posizione reciproca (a coppie) tra i seguenti sottospazi affini di \mathbb{R}^3 :

$$\bullet \left(\begin{array}{c} -1 \\ 4 \\ \sqrt{2} \end{array} \right) \bullet \left(\begin{array}{c} 2 \\ 1 \\ -7 \end{array} \right) + \text{Span} \left(\begin{array}{c} -2 \\ +3 \\ 1 \end{array} \right)$$

$$\bullet \left(\begin{array}{c} 1 \\ 0 \\ -4 \end{array} \right) + \text{Span} \left(\begin{array}{c} 5 \\ -2 \\ -12 \end{array} \right) \bullet \left(\begin{array}{c} 1 \\ 2 \\ 0 \end{array} \right) + \text{Span} \left(\begin{array}{c} -3 \\ 5 \\ 1 \end{array} \right)$$

$$\bullet \begin{cases} 2x - y + z = 3 \\ x + 3y - 4z = 5 \end{cases} \bullet \begin{cases} 2x + y + z = 9 \\ 3y - 2z + 19z = 4 \end{cases}$$

$$\bullet \left(\begin{array}{c} 1 \\ -1 \\ 4 \end{array} \right) + \text{Span} \left(\left(\begin{array}{c} 4 \\ 3 \\ -1 \end{array} \right), \left(\begin{array}{c} 0 \\ 9 \\ 1 \end{array} \right) \right)$$

$$\bullet \left(\begin{array}{c} 5 \\ 1 \\ -1 \end{array} \right) + \text{Span} \left(\left(\begin{array}{c} 1 \\ 4 \\ -1 \end{array} \right), \left(\begin{array}{c} 2 \\ 1 \\ 0 \end{array} \right) \right)$$

$$\bullet 2x - y + z = 4$$

(2) Stabilire la posizione reciproca di

$$\begin{cases} x - y + 2z - 4w = 5 \\ 3x + y - z + 5w = 9 \end{cases} \subset \mathbb{R}^4$$

$$\left(\begin{array}{c} -1 \\ 2 \\ 0 \\ 3 \end{array} \right) + \text{Span} \left(\left(\begin{array}{c} 1 \\ 1 \\ -3 \\ -1 \end{array} \right), \left(\begin{array}{c} 2 \\ 1 \\ -1 \\ 2 \end{array} \right) \right)$$

e calcolare la dimensione della somma.

(3) Calcolare la dimensione delle somme di

$$\bullet \begin{pmatrix} 1 \\ 4 \\ -1 \\ 3 \end{pmatrix} + \text{Span} \begin{pmatrix} -1 \\ 2 \\ 0 \\ 3 \end{pmatrix}$$

$$\begin{pmatrix} 2 \\ -1 \\ 2 \\ 1 \end{pmatrix} + \text{Span} \begin{pmatrix} 5 \\ 1 \\ 2 \\ 0 \end{pmatrix}$$

$$\bullet \begin{pmatrix} -1 \\ 2 \\ 2 \\ 4 \end{pmatrix} + \text{Span} \begin{pmatrix} 2 \\ -1 \\ 3 \\ 1 \end{pmatrix}$$

$$\begin{cases} 3x + 2y - z = 9 \\ x - y + z - w = 2 \end{cases}$$

$$\bullet \begin{pmatrix} -3 \\ 4 \\ 2 \\ 1 \end{pmatrix} + \text{Span} \begin{pmatrix} -2 \\ 1 \\ 2 \\ 3 \end{pmatrix}$$

$$\begin{cases} -x - y + 2z - w = 4 \\ 2x - z + 2w = 1 \end{cases}$$

$$\bullet \begin{pmatrix} 2 \\ 1 \\ -1 \\ 0 \end{pmatrix} + \text{Span} \begin{pmatrix} 3 \\ 2 \\ -1 \\ 4 \end{pmatrix}$$

$$\begin{cases} 2x - y + z - w = 0 \\ 3x + y - 2z + w = 4 \end{cases}$$