

ALGEBRA
Cvičenie 6

1. Zistite, či uvedené vektory ležia v podpriestore S , ak

$$\begin{aligned}S &= \langle (1, 3, 1, 6), (2, -2, 2, 4), (3, -3, 1, 2) \rangle, \\ \vec{u} &= (1, 0, -1, -1), \\ \vec{v} &= (2, 1, 1, 5).\end{aligned}$$

Platí potom $\langle \vec{u}, \vec{v} \rangle \subseteq S$? Rovnajú sa?

2. Nech $\vec{v}_1, \vec{v}_2, \dots, \vec{v}_n$ sú ľubovoľné vektory z vektorového priestoru V nad poľom F . Dokážte, že pre ľubovoľné $c \in F$, $c \neq 0$ platí

$$\langle \vec{v}_1, \vec{v}_2, \dots, \vec{v}_n \rangle = \langle c\vec{v}_1, \vec{v}_2, \dots, \vec{v}_n \rangle$$

a pre každé $c \in F$ platí

$$\langle \vec{v}_1, \vec{v}_2, \dots, \vec{v}_n \rangle = \langle \vec{v}_1 + c\vec{v}_2, \vec{v}_2, \dots, \vec{v}_n \rangle.$$

3. Určte prienik podpriestorov S a T , ak

$$\begin{aligned}S &= \langle (1, -1, 3, -2), (2, -3, 4, -2), (1, -3, -1, 2) \rangle, \\ T &= \langle (4, -2, -4, 2), (3, 0, -5, 2) \rangle,\end{aligned}$$

ak

$$\begin{aligned}S &= \{(x, y, z, q) \in \mathbb{R}^4 : x - 2y - 2z + q = 0\}, \\ T &= \langle (1, -2, -1, 3), (4, 2, -1, -2), (5, 0, -2, 1) \rangle,\end{aligned}$$

a ak

$$\begin{aligned}S &= \{(x, y, z, q) \in \mathbb{R}^4 : x - y + z = 0\}, \\ T &= \langle (2, 0, 0, 1), (-1, 0, 1, 0), (1, 1, 0, 0) \rangle.\end{aligned}$$

DÚ Určte prienik podpriestorov S a T , ak

$$\begin{aligned}S &= \langle (1, 2, -1, 0), (2, -2, -5, 3), (2, 0, -4, 2) \rangle, \\ T &= \langle (1, 0, -2, 1), (2, 2, -1, 0), (5, 4, -4, 1) \rangle.\end{aligned}$$