

$$7) \vec{n} = (1, -1, 5)$$

~~$$q = \{[1, 4, -1, 5, 5, 1]\}$$~~

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11) Rychle musíme

$$-6 + 1 = -5 - k$$

$$7 - 1 = 3 - 2k$$

$$2k = 5 + k$$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 1 \\ -1 & 2 & 4 & 4 \\ 2 & -1 & 5 & 5 \end{array}\right) \sim \left(\begin{array}{ccc|c} 1 & 1 & 1 & 1 \\ 0 & -3 & 3 & 3 \\ 0 & -3 & 3 & 3 \end{array}\right) \sim \left(\begin{array}{ccc|c} 1 & 1 & 1 & 1 \\ 0 & -3 & 3 & 3 \\ 0 & 1 & -1 & -1 \end{array}\right)$$

$$\sim \left(\begin{array}{ccc|c} 1 & 0 & 2 & 2 \\ 0 & 1 & -1 & -1 \end{array}\right) \Rightarrow p = [-4, 5, 4]$$

$$l) 1 + k = 4 - 2k$$

~~$$7k - 3 = 2k$$~~

$$5k = 7 + 4k$$

$$k = 3 - 2k$$

$$\left(\begin{array}{cc|c} 1 & 2 & 3 \\ 2 & 4 & 1 \\ 1 & 2 & 3 \end{array}\right) \sim \left(\begin{array}{cc|c} 1 & 2 & 3 \\ 0 & 0 & -5 \\ 0 & 0 & -5 \end{array}\right)$$

\Rightarrow NEMA' ŘEŠENÍ

$$\Rightarrow p \cap q = \emptyset$$

$$\vec{u} = (1, -2, 1)$$

$$\vec{v} = (-2, 4, -2) \sim (1, -2, 1)$$

$$\Rightarrow p \parallel q$$

$$30) A[-2, 1, 8] \vec{u}(3, 1, -2) \vec{v}(1, 4, -1)$$

$$\uparrow: x = 3A + B - 2 \quad (1)$$

$$y = A + 2B + 1 \quad (2)$$

$$z = -2A - B + 8 \quad (3)$$

$$\begin{aligned} 5x + 5z &= -9 \quad -3A + 41 \quad (2) + (3) \\ 3x + 3y + 5z &= 0 \quad + 0A + 35 \end{aligned}$$

$$15) \vec{AB} = (-2, -4, 2) \sim (1, 2, -1)$$

$$\vec{CD} = (5, m-8, 4)$$

$$\left(\begin{array}{ccc} 1 & 2 & -1 \\ 5 & m-8 & 4 \end{array}\right) \sim \left(\begin{array}{ccc} 1 & 2 & -1 \\ 0 & m-18 & 9 \end{array}\right) \Rightarrow \text{vždy lin.}$$

Průsečík: $\vec{AB} = \{[3+2k, 2k-1, k] \mid k \in \mathbb{R}\}$

$$\vec{CD} = \{[-2+5k, 8+(m-8)k, 3-4k] \mid k \in \mathbb{R}\}$$

$$3+k = -2+5k \rightarrow 2 = 1+k \Rightarrow k=1$$

$$2+2k = 8+(m-8)k \quad -1-k = 3-4k \Rightarrow k=0$$

$$-1-k = 3-4k \Rightarrow k=0$$

$$2 = 8 + m - 8 \Rightarrow 2 = m$$

Když $m=2$ existuje průsečík $[3, 2, -1]$

$$25) \vec{m}_p = (2, -1, 0) \Rightarrow p: 2x - y + 0z + d = 0$$

$$M \in p \Rightarrow 2 \cdot 2 - 1 \cdot 0 + 0 \cdot 5 + d = 0 \Rightarrow d = -4$$

$$p: 2x - y + 0z - 4 = 0$$

$$26) \vec{m}_o = (3, -2, 1) \quad p: kx + ly + mz + d = 0$$

$$\vec{m}_p = (1, 1, 1)$$

$$o \perp p \Leftrightarrow 0 = \vec{m}_o \cdot \vec{m}_p = 3 - 2a + b \Rightarrow b = 2a - 3$$

$$A[2, 3, 0] \in p \Rightarrow 2 + 3a + b = 0 \Rightarrow b = -3a - 2$$

$$B[-1, 2, 2] \in p \Rightarrow -1 + 2a + 2(2a - 3) + (-3a - 2) = 0 \Rightarrow a = 3$$

$$p: x + 3y + 3z - 11 = 0$$

jelikož je rovina jednovrstevná, příklad $e: 0x + ay + bz + c = 0$ není třeba normalizovat.

$$T: 3x + 3y + 5z - 35 = 0 \quad \left(\begin{array}{ccc|c} 1 & -2 & 3 & 3 \\ 2 & -1 & 1 & 1 \\ 3 & 0 & 1 & -5 \end{array}\right) \sim \left(\begin{array}{ccc|c} 1 & -2 & 3 & 3 \\ 0 & 3 & -5 & -5 \\ 0 & 3 & -5 & -5 \end{array}\right)$$