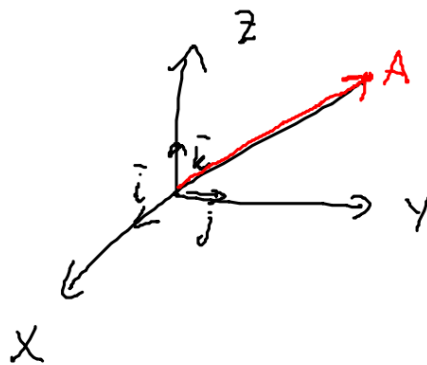


Kantavektorit : $\bar{i}, \bar{j}, \bar{k}$



$$A = (x, y, z) \iff \overrightarrow{OA} = x\bar{i} + y\bar{j} + z\bar{k}$$

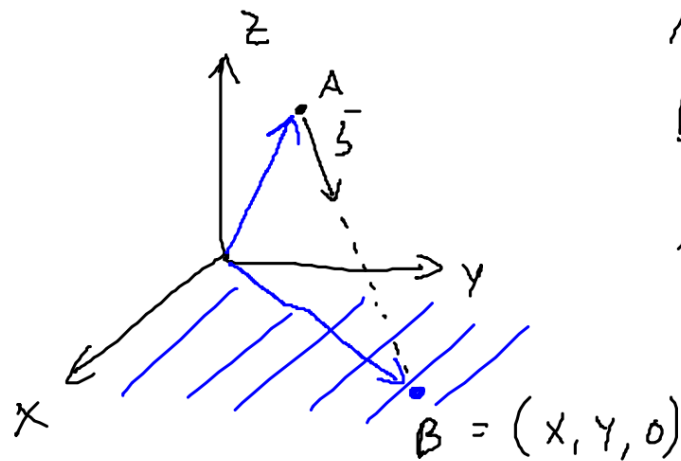
$$\bar{a} = a_x\bar{i} + a_y\bar{j} + a_z\bar{k} \rightarrow |\bar{a}| = \sqrt{a_x^2 + a_y^2 + a_z^2}$$

$$A = (x_1, y_1, z_1), B = (x_2, y_2, z_2)$$

$$\overrightarrow{AB} = (x_2 - x_1)\bar{i} + (y_2 - y_1)\bar{j} + (z_2 - z_1)\bar{k}$$

EI 4.4. PALLOA EIKÄ KESKIPISTETTÄ!

429.



$$A = (6, 3, 8)$$

$$\vec{b} = 2\vec{i} + \vec{j} - 4\vec{k}$$

xy - tarossa $z=0$

$$\vec{OB} = \vec{OA} + r\vec{b} = 6\vec{i} + 3\vec{j} + 8\vec{k} + r(2\vec{i} + \vec{j} - 4\vec{k})$$

$$x\vec{i} + y\vec{j} + 0\vec{k} = \vec{i}(6+2r) + \vec{j}(3+r) + \vec{k}(8-4r)$$

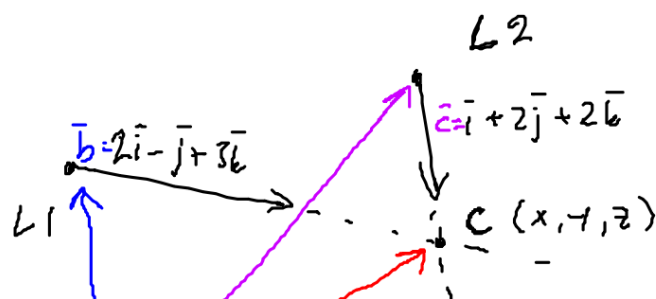
$$\begin{cases} x = 6 + 2r \\ y = 3 + r \\ 0 = 8 - 4r \end{cases} \rightarrow \begin{matrix} = 10 \\ = 5 \\ r = 2 \end{matrix}$$

$$V: (10, 5, 0)$$

430.

$$L_1 = (200, 400, 0)$$

$$L_2 = (300, -400, 5)$$



V: eivät leikkaa

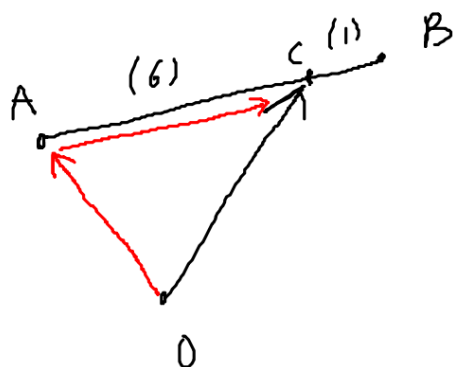
$$\begin{cases} \vec{OC} = \vec{OL}_1 + r\vec{b} = 200\vec{i} + 400\vec{j} + r(2\vec{i} - \vec{j} + 3\vec{k}) \\ \vec{OC} = \vec{OL}_2 + s\vec{c} = 300\vec{i} - 400\vec{j} + 5\vec{k} + s(\vec{i} + 2\vec{j} + 2\vec{k}) \end{cases}$$

$$\begin{cases} \vec{i} & 200 + 2r = 300 + s \\ \vec{j} & 400 - r = -400 + 2s \\ \vec{k} & 3r = 5 + 2s \end{cases}$$

Ratka. r ja s kahdesta
yhtälöstä $\rightarrow r = 200$ ja
 $s = 300$

Sijoita alimpaan:
 $3 \cdot 200 \neq 5 + 2 \cdot 300$

438.



$$A = (2, -7, 6)$$

$$B = (-5, 14, -8)$$

$$\vec{OC} = \vec{OA} + \frac{6}{7} \vec{AB}$$

$$= 2\vec{i} - 7\vec{j} + 6\vec{k} + \frac{6}{7} \begin{pmatrix} (-5-2) \\ 14-(-7) \\ (-8-6) \end{pmatrix}$$

$$= 2\vec{i} - 7\vec{j} + 6\vec{k} - 6\vec{i} + 18\vec{j} - 12\vec{k}$$

$$= -4\vec{i} + 11\vec{j} - 6\vec{k}$$

$$V: C = (-4, 11, -6)$$

S. 102:

413, 414

($\vec{a} = t\vec{b}$)

416

419

S. 112: 432, 435, 436,
439

414. Kantavektorit

$$\begin{aligned}
 -2\bar{i} + \bar{j} + 3\bar{k} &= \bar{a} \\
 \bar{i} + \bar{k} &= \bar{b} \\
 2\bar{j} &= \bar{c}
 \end{aligned}$$

$$\bar{v} = s\bar{a} + r\bar{b} + t\bar{c}$$

a) $-5\bar{i} = s(-2\bar{i} + \bar{j} + 3\bar{k}) + r(\bar{i} + \bar{k}) + t(2\bar{j})$

$$\begin{cases}
 -5 = -2s + r \\
 0 = s + 2t \\
 0 = 3s + r
 \end{cases}
 \begin{array}{l}
 \text{solve for } \\
 \rightarrow r = -3, \quad s = 1, \quad t = -\frac{1}{2}
 \end{array}$$

Varit: $\bar{v} = \bar{a} - 3\bar{b} - \frac{1}{2}\bar{c}$