

$$\Rightarrow \vec{PC} = (2 - 2 \cdot (-1))\hat{i} + (-6 - 3 \cdot (-1))\hat{j} - (-1)\hat{k} = 4\hat{i} - 3\hat{j} + \hat{k}$$

a) $\Rightarrow C = (-1 + 4, 2 - 3, 3 + 1) = (3, -1, 4)$

b) $|\vec{PC}| = \sqrt{4^2 + (-3)^2 + 1^2} = \sqrt{26} \approx 5,10$

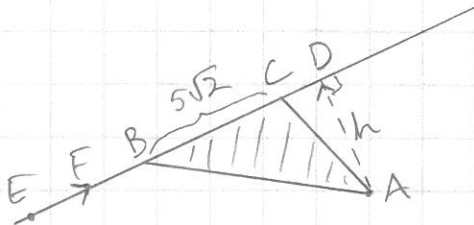
10.6 Suora: $\begin{cases} x = 2 - t \\ y = 3 - t \\ z = 1 - t \end{cases}, t \in \mathbb{R}$

$\Rightarrow$ suora: $P = (2 - t, 3 - t, 1 - t)$

$A = (1, 3, -1)$

Määritellään 2 suoran pistettä

$t = 0: E = (2, 3, 1)$
 $t = 1: F = (1, 2, 0) \Rightarrow \vec{EF} = -\hat{i} - \hat{j} - \hat{k}$



$$\begin{aligned} \vec{AD} &= \vec{AE} + \vec{ED} \\ &= \vec{AE} + t\vec{EF} \\ &= (\hat{i} + 2\hat{k}) + t(-\hat{i} - \hat{j} - \hat{k}) \end{aligned}$$

$$= (1 - t)\hat{i} - t\hat{j} + (2 - t)\hat{k} \quad \leftarrow \text{rj.}$$

$\vec{EF} \perp \vec{AD} \Leftrightarrow \vec{EF} \cdot \vec{AD} = -1 \cdot (1 - t) + (-1) \cdot (-t) + (-1) \cdot (2 - t) = 0$

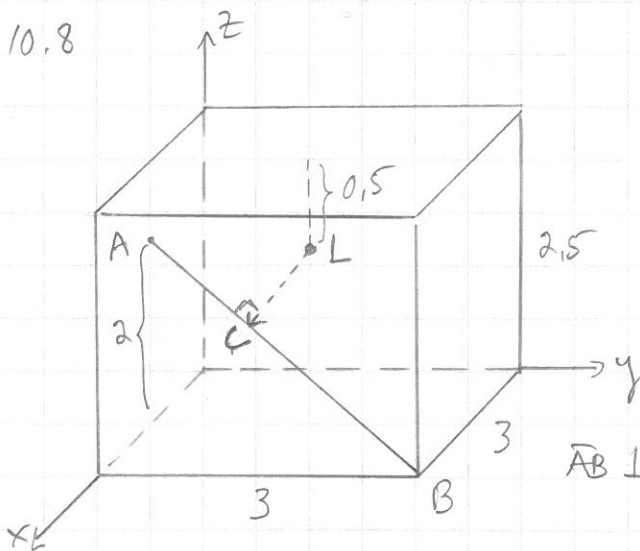
$\Leftrightarrow 3t - 3 = 0 \quad \Leftrightarrow t = 1$

$\Rightarrow \vec{AD} = -\hat{j} + \hat{k}$

Kolmion korkeus: $h = |\vec{AD}| = \sqrt{(-1)^2 + 1^2} = \sqrt{2}$

Kolmion pinta-ala: $A = \frac{1}{2} |\vec{BC}| \cdot h = \frac{1}{2} \cdot 5\sqrt{2} \cdot \sqrt{2} = 5$

10.8



$A = (\frac{3}{2}, 0, 2)$

$B = (3, 3, 0)$

$L = (\frac{3}{2}, \frac{3}{2}, 2)$

$\vec{LC} = \vec{LA} + \vec{AC}$

$= \vec{LA} + t\vec{AB}$

$= (-\frac{3}{2}\hat{j}) + t(\frac{3}{2}\hat{i} + 3\hat{j} - 2\hat{k})$

$= \frac{3}{2}t\hat{i} + (-\frac{3}{2} + 3t)\hat{j} - 2t\hat{k} \quad \leftarrow$

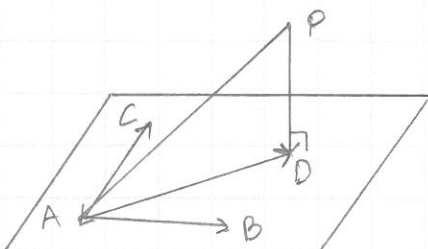
$\vec{AB} \perp \vec{LC} \Leftrightarrow \vec{AB} \cdot \vec{LC} = \frac{3}{2} \cdot \frac{3}{2}t + 3(-\frac{3}{2} + 3t) - 2 \cdot (-2t) = 0$

$\Leftrightarrow t = \frac{18}{61}$

$\Rightarrow |\vec{LC}| = \sqrt{(\frac{3}{2} \cdot \frac{18}{61})^2 + (-\frac{3}{2} + 3 \cdot \frac{18}{61})^2 + (-2 \cdot \frac{18}{61})^2} = \frac{15\sqrt{61}}{122} \approx 0,96 \text{ (m)}$

11. Pisteen stanssijan taso

toon suunnatusta



$\vec{PD} = \vec{PA} + \vec{AD} = \vec{PA} + \lambda\vec{AB} + t\vec{AC}$

$\begin{cases} \vec{AB} \perp \vec{PD} \Leftrightarrow \vec{AB} \cdot \vec{PD} = 0 \\ \vec{AC} \perp \vec{PD} \Leftrightarrow \vec{AC} \cdot \vec{PD} = 0 \end{cases}$

$\Rightarrow \lambda = \dots, t = \dots$

$\Rightarrow \vec{PD} = \dots$