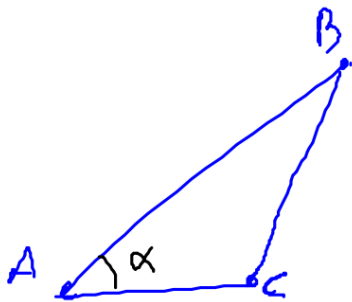


$$A = (2, -1, 3) \Leftrightarrow \vec{OA} = 2\vec{i} - \vec{j} + 3\vec{k}$$

$$|\vec{OA}| = \sqrt{2^2 + 1^2 + 3^2} = \sqrt{14}$$

$$B = (0, 7, 2)$$

$$\vec{AB} = (0-2)\vec{i} + (7-(-1))\vec{j} + (2-3)\vec{k} = -2\vec{i} + 8\vec{j} - \vec{k}$$



$$C = (-1, 2, 4)$$

$$\vec{AC} = -3\vec{i} + 3\vec{j} + \vec{k}$$

$$\vec{BC} = -\vec{i} - 5\vec{j} + 2\vec{k}$$

$$\vec{a} \cdot \vec{b} = 0 \Leftrightarrow \vec{a} \perp \vec{b}$$

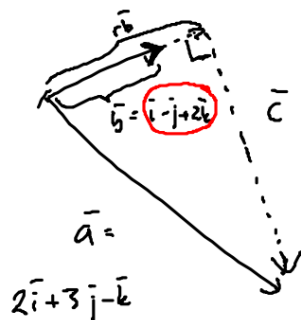
$$\vec{AB} \cdot \vec{AC} = -3 \cdot (-2) + 3 \cdot 8 + 1 \cdot (-1) = 17$$

$$\cos \alpha = \frac{\vec{AB} \cdot \vec{AC}}{|\vec{AB}| |\vec{AC}|} = \frac{17}{\sqrt{69} \sqrt{19}} \approx 0,4695 \rightarrow \alpha \approx 62^\circ$$

454.

S. 117:

446-454



$$\begin{aligned}\vec{c} &= -r\vec{b} + \vec{a} = -r(\vec{i} - \vec{j} + 2\vec{k}) + 2\vec{i} + 3\vec{j} - \vec{k} \\ &= \vec{i}(2-r) + \vec{j}(3+r) + (-2r-1)\vec{k} \\ &= \frac{5}{2}\vec{i} + \frac{5}{2}\vec{j}\end{aligned}$$

$$\vec{b} \cdot \vec{c} = 0$$

$$1 \cdot (2-r) + (-1)(3+r) + 2 \cdot (-2r-1) = 0$$

$$r = -\frac{1}{2}$$

$$\vec{a} = r\vec{b} + \vec{c}$$

$$= -\frac{1}{2}(\vec{i} - \vec{j} + 2\vec{k}) + \frac{5}{2}\vec{i} + \frac{5}{2}\vec{j}$$

V: Komponenten $-\frac{1}{2}(\vec{i} - \vec{j} + 2\vec{k})$ zu $\frac{5}{2}\vec{i} + \frac{5}{2}\vec{j}$

452.

$$\bar{a} = 3\bar{i} + 2\bar{j}$$

$$\bar{b} = 2\bar{j} + 5\bar{k}$$

$$\bar{c} = x\bar{i} + y\bar{j} + z\bar{k}$$

$$\begin{cases} \bar{a} \cdot \bar{c} = 0 \\ \bar{b} \cdot \bar{c} = 0 \\ |\bar{c}| = \frac{19}{2} \end{cases} \rightarrow \begin{cases} 3x + 2y = 0 \\ 2y + 5z = 0 \\ \sqrt{x^2 + y^2 + z^2} = \frac{19}{2} \end{cases} \quad | \quad ()^2$$

$$\begin{cases} 3x + 2y = 0 \\ 2y + 5z = 0 \\ x^2 + y^2 + z^2 = \left(\frac{19}{2}\right)^2 \end{cases} \xrightarrow{\text{solve}} \begin{cases} x = -5 \\ y = \frac{15}{2} \\ z = -3 \end{cases} \quad \text{and} \quad \begin{cases} x = 5 \\ y = -\frac{15}{2} \\ z = 3 \end{cases}$$