

Schnittwinkel: $\cos \angle (\vec{u}_1, \vec{u}_2) = 0 \leadsto \alpha = 90^\circ \leadsto E_1 \perp E_2$

2.8.7.

a)

$$a) \quad E: \vec{r}_E = \begin{pmatrix} r_1 \\ 1 \\ 1 \\ 1 \end{pmatrix} + s \begin{pmatrix} a_1 \\ 0 \\ 1 \\ -1 \end{pmatrix} \Rightarrow \vec{y} = \begin{pmatrix} -1 \\ 1 \\ 1 \end{pmatrix}$$

$$g: \vec{r}_g = \begin{pmatrix} r_2 \\ 2 \\ 2 \\ 1 \end{pmatrix} + u \begin{pmatrix} a_2 \\ 2 \\ 0 \\ 1 \end{pmatrix}$$

$$\vec{r}_g = \begin{pmatrix} r_2 \\ 2 \\ 2 \\ 1 \end{pmatrix} + \frac{1-1}{1} \cdot \begin{pmatrix} a_2 \\ 2 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ 2 \\ 2 \\ 1 \end{pmatrix}$$

$$b) \quad E: x - y + 2z = 4 \quad g: \vec{r} = \begin{pmatrix} 2 \\ 2 \\ 1 \end{pmatrix} + u \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}$$

$$\vec{n} = \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix}$$

$$\vec{n} \circ \vec{r}_1 = 4 \quad \vec{n} \circ \vec{r}_2 = 2 \quad \vec{n} \circ \vec{a}_2 = 4$$

$$\vec{r}_g = \begin{pmatrix} 2 \\ 2 \\ 1 \end{pmatrix} + \frac{4-2}{4} \cdot \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} 3 \\ 2 \\ 1.5 \end{pmatrix}$$

b)

$$a) \quad \cos \angle (\vec{u}_1, \vec{a}_2) = \frac{-1}{\sqrt{3} \cdot \sqrt{5}} = \frac{-1}{\sqrt{15}} \\ \Rightarrow \angle (\vec{u}_1, \vec{a}_2) = 180^\circ - 105^\circ = 75^\circ \leadsto \alpha = 15^\circ$$

$$b) \quad \cos \angle (\vec{u}_1, \vec{a}_2) = \frac{4}{\sqrt{6} \cdot \sqrt{5}} = \frac{4}{\sqrt{30}}$$

$$\Rightarrow \angle (\vec{u}_1, \vec{a}_2) = 43,1^\circ \Rightarrow \alpha = 46,9^\circ$$