

S 296 Nr. 1

$$a) \quad g: \vec{x} = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + r \begin{pmatrix} 1 \\ 0 \\ 3 \end{pmatrix}; \quad h: \vec{x} = \begin{pmatrix} 2 \\ 2 \\ 3 \end{pmatrix} + s \begin{pmatrix} 1 \\ -1 \\ 3 \end{pmatrix}$$

$$\cos(d) = \frac{\left| \begin{pmatrix} 1 \\ 0 \\ 3 \end{pmatrix} \cdot \begin{pmatrix} 1 \\ -1 \\ 3 \end{pmatrix} \right|}{\left| \begin{pmatrix} 1 \\ 0 \\ 3 \end{pmatrix} \right| \cdot \left| \begin{pmatrix} 1 \\ -1 \\ 3 \end{pmatrix} \right|} = \frac{|1 \cdot 1 + 0 \cdot (-1) + 3 \cdot 3|}{\sqrt{1^2 + 3^2} \cdot \sqrt{1^2 + (-1)^2 + 3^2}} = \frac{|10|}{\sqrt{10 \cdot 11}}$$

$$\cos(d) = \frac{10}{\sqrt{110}} \Rightarrow \underline{d} = \arccos\left(\frac{10}{\sqrt{110}}\right) \approx \underline{\underline{17,55^\circ}}$$

b) $d = 30,2^\circ$ c) $d = 59,7^\circ$ d) $d = 88,1^\circ$

S 296 Nr. 2

a) Schnittwinkel zwischen Ebene E_1 und E_2

$$E_1: \left[\vec{x} - \begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix} \right] \cdot \underbrace{\begin{pmatrix} 5 \\ 0 \\ 1 \end{pmatrix}}_{\vec{n}_1} = 0; \quad E_2: \left[\vec{x} - \begin{pmatrix} 2 \\ 3 \\ 7 \end{pmatrix} \right] \cdot \underbrace{\begin{pmatrix} 6 \\ 1 \\ 0 \end{pmatrix}}_{\vec{n}_2} = 0$$

$$\cos(d) = \frac{\left| \begin{pmatrix} 5 \\ 0 \\ 1 \end{pmatrix} \cdot \begin{pmatrix} 6 \\ 1 \\ 0 \end{pmatrix} \right|}{\left| \begin{pmatrix} 5 \\ 0 \\ 1 \end{pmatrix} \right| \cdot \left| \begin{pmatrix} 6 \\ 1 \\ 0 \end{pmatrix} \right|} = \frac{|5 \cdot 6 + 0 \cdot 1 + 1 \cdot 0|}{\sqrt{25+1} \cdot \sqrt{36+1}} = \frac{30}{\sqrt{26 \cdot 37}} = \frac{30}{\sqrt{962}}$$

$$\underline{d} = \arccos\left(\frac{30}{\sqrt{962}}\right) \approx \underline{\underline{14,71^\circ}}$$

b) $d = 55,5^\circ$ c) $d \approx 70,8^\circ$ d) $d = 90^\circ$