

G2

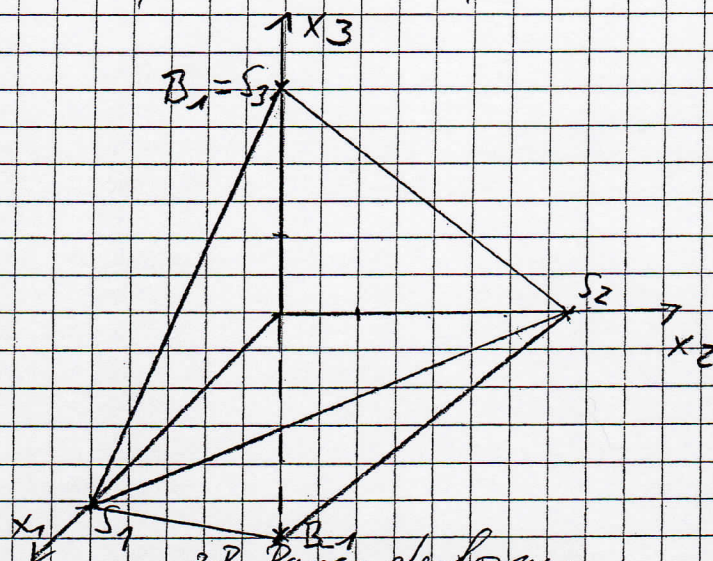
$$3tx_1 + 4tx_2 + 5x_3 - 15t = 0 \quad t \in \mathbb{R}$$

$$a) E_1: 3x_1 + 4x_2 + 5x_3 - 15 = 0$$

$$E_0: 5x_3 = 0$$

Schnittpunkte von E_1 mit den Koordinatenachsen

$$S_1(5|0|0); S_2(0|\frac{15}{4}|0); S_3(0|0|3)$$



z.B. Parameterform.

$$g: E_1 \cap E_0, \quad E_1: \vec{x} = \begin{pmatrix} 5 \\ 0 \\ 0 \end{pmatrix} + \tau \begin{pmatrix} -4 \\ 3 \\ 0 \end{pmatrix} + \rho \begin{pmatrix} -5 \\ 0 \\ 3 \end{pmatrix}$$

$$g: \vec{x} = \begin{pmatrix} 5 \\ 0 \\ 0 \end{pmatrix} + \tau \begin{pmatrix} -4 \\ 3 \\ 0 \end{pmatrix}$$

$$E_0: \vec{x} = \tau' \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} + \rho' \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$$

g in E_t einsetzen. $3(5-4\tau) + 4 \cdot 3\tau - 15 = 15 - 12\tau + 12\tau - 15 = 0$ $g \in g$

b) $F \in g: F((5-4\tau) | 3\tau | 0)$ $OF \perp g \Rightarrow \begin{pmatrix} 5-4\tau \\ 3\tau \\ 0 \end{pmatrix} \cdot \begin{pmatrix} -4 \\ 3 \\ 0 \end{pmatrix} = 0 \Rightarrow \tau = \frac{4}{5}$

$$F\left(\frac{9}{5} \mid \frac{12}{5} \mid 0\right); |OF| = 3$$

c) $E_t \perp E_{t^*}, t \neq t^* \quad \begin{pmatrix} 3t \\ 4t \\ 5 \end{pmatrix} \cdot \begin{pmatrix} 3t^* \\ 4t^* \\ 5 \end{pmatrix} = 0 \Rightarrow 25tt^* = -25$

$$t = -\frac{1}{t^*}$$

$$B_t(0|0|3t); B_{t^*}(0|0|3t^*) \Rightarrow B_{t^*}(0|0|-\frac{3}{t})$$

$$|B_t B_{t^*}| = \frac{3}{t} + 3t = d(B_t; B_{t^*}), \quad \text{für } t=1 \text{ minimal}$$

$$d(t) = 3t + 3t^{-1}; \quad d'(t) = 3 - 3t^{-2}; \quad d''(t) = 6t^{-3} > 0$$

$$3 - \frac{3}{t^2} = 0 \Rightarrow t = 1$$