

MafI 1 UB10

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10.1 Untervektoren, lineare Abhaengigkeit und Basis

10.1.1

$$U := \{(x_1, x_2, x_3)^t \in \mathbb{R}^3 \mid x_1 = x_2\}$$

$$(0, 0, 0)^t \in U \Rightarrow U \neq \emptyset$$

$$\begin{aligned} \forall x \in U. (x_1, x_2, x_3)^t &= (x_1, x_1, x_3)^t \\ x_1, x_2 &\in U \end{aligned}$$

$$\begin{aligned} x_1 + x_2 &= (x_1 + x'_1, x_1 + x'_1, x_3 + x'_3) \\ o \text{ offensichtlich gilt } x_1 + x'_1 &= x_1 + x'_1 \end{aligned}$$

$$\begin{aligned} s &\in \mathbb{R} \\ s * x_2 &= (s * x_1 + s * x_1 + x_3) \in U \end{aligned}$$

10.1.2

$$B_U = \{(1, 1, 0)^t, (0, 0, 1)^t\}$$

$$\begin{aligned} (0, 0, 0)^t &= a * (1, 1, 0)^t + b * (0, 0, 1)^t \\ \Rightarrow a = b &= 0 \end{aligned}$$

10.1.3

$$\begin{aligned} x_1 &= (1, -1), x_2 = (1, 1) \in U \\ x_1 + x_2 &= (2, 0) \end{aligned}$$

$$|2\rangle \neq |0\rangle_z$$