

$a \cdot m = (a+0) \cdot m = a \cdot m + 0 \cdot m$   
 $\Rightarrow 0 \cdot m = 0$  ✓  
 $m + (-1)m = (1+(-1)) \cdot m = 0 \cdot m = 0$  ✓

$v = 2u$   
 $2u - v = 0$

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lin. nörst:  $a_1 v_1 + \dots + a_n v_n = 0$   
 $\Rightarrow a_2 v_2 + \dots + a_n v_n = -a_1 v_1 \quad | \cdot a_1^{-1}$   
 $-\left(\frac{a_2}{a_1} v_2 + \dots + \frac{a_n}{a_1} v_n\right) = v_1$

$\{ f: M \rightarrow V \}$   
 $(f+g)(v) = f(v) + g(v)$   
 $(af)(v) = a \cdot f(v)$

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$R_w[x] : 1, x, x^2, \dots, x^n$

$K^n :$   
 $\langle (1, 0, \dots, 0) \rangle$   
 $\langle (0, 1, \dots, 0) \rangle$   
 $\langle (0, 0, 1, \dots) \rangle$   
 $\langle (0, 0, \dots, 1) \rangle$

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$v_1 + v_2 + v_3 + v_4 + v_5$   
 $\in V_1$   
 $\in V_3$

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Vektorraum über  $K$  mit  $|M| = 1, 2, \dots, n$   
 $V = \langle v_1, \dots, v_{n+1} \rangle, v_i$  lin. nörst  $\Rightarrow$   
 $v_{j_0} = a_1 v_1 + \dots + a_{n+1} v_{n+1}$   
 $\uparrow$  nörst  
 $\underline{v} = (v_1, \dots, v_n)$  lin. V a nörst  
 Mt.  $a_1 v_1 + \dots + a_n v_n = \mu \neq 0, a_i \neq 0$   
 $v_n = \frac{1}{a_n} (\mu - (a_1 v_1 + \dots))$   
 $\Rightarrow \langle v_1, v_2, \dots, v_{i-1}, v_{i+1}, \dots, v_n \rangle$  nörst.

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$W_1 \cap W_2$   
 $= \langle \underbrace{v_1, \dots, v_k}_{W_1}, \underbrace{v_{k+1}, \dots, v_{n_1}}_{W_2}, v_{k+1}, \dots, v_{n_2} \rangle$

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$$\underline{v}: V \rightarrow K^m$$

$$u = a_1 v_1 + \dots + a_n v_n$$

$$w = b_1 v_1 + \dots + b_n v_n$$

$$u+w = (a_1+b_1)v_1 + \dots + (a_n+b_n)v_n$$

$$f: \mathbb{R}^3 \rightarrow \mathbb{R}^2 \quad \begin{pmatrix} x \\ y \\ z \end{pmatrix} \xrightarrow{B} \begin{pmatrix} x+y \\ z-x \end{pmatrix}$$

$$B = \begin{pmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$


$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} \xrightarrow{A} \begin{pmatrix} x \\ y \end{pmatrix}$$

$$A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix}$$

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