LinA Test I
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1 Nein. Es muss gelten

(Axiom 8) $\forall \lambda, \mu \in \mathbb{R} : \forall x \in \mathbb{R}^2 : (\lambda + \mu)x = \lambda x + \mu x$

Aber $(\lambda + \mu) \odot x = x \neq 2x = x + x = \lambda x + \mu x$

② $a=\begin{pmatrix}3\\1\\2\end{pmatrix}$ $b=\begin{pmatrix}-6\\-2\\-4\end{pmatrix}$ $c=\begin{pmatrix}4\\5\\4\end{pmatrix}$

(Es gilt $b=-2a$)

Sei $d=a$ eine triviale Linearkombination von a,b,c.

Nun $LIN(a,b,c,d)=LIN(a,c)$

Wir lösen $\lambda_1 a+\lambda_2 c=e:=\begin{pmatrix}5\\2\\2\end{pmatrix}$

$$\begin{array}{ccc} -3 & -15 & -6 \\ \multicolumn{3}{c}{\left(\begin{array}{cc|c} 3 & 4 & 5 \\ 1 & 5 & 2 \\ 2 & 4 & 2 \end{array}\right)} \\ -2 & -10 & -4 \end{array}$$

$$\begin{array}{l} I=I-3II \\ III=III-2II \\ \rightsquigarrow \end{array} \begin{array}{ccc} & +12 & +4 \\ \multicolumn{3}{c}{\left(\begin{array}{cc|c} 0 & -11 & -1 \\ 1 & 5 & 2 \\ 0 & -6 & -2 \end{array}\right)} \end{array}$$

$$\begin{array}{l} I=I-2III \\ \rightsquigarrow \end{array} \left(\begin{array}{cc|c} 0 & 1 & 3 \\ 1 & 5 & 2 \\ 0 & -6 & -2 \end{array}\right)$$

$$\begin{array}{l} II=II-5I \\ III=III+6I \\ \rightsquigarrow \end{array} \left(\begin{array}{cc|c} 0 & 1 & 3 \\ 1 & 0 & -13 \\ 0 & 0 & 16 \end{array}\right)$$

$$\rightsquigarrow \left(\begin{array}{cc|c} 1 & 0 & -13 \\ 0 & 1 & 3 \\ 0 & 0 & 16 \end{array}\right)$$

$\Rightarrow Rg([a\ c]) \neq Rg([a\ c\ e])$

$\Rightarrow e \notin LIN(a,c)=LIN(a,b,c,d)$