

Quiz 2

1. (5 points) Consider the matrix $A = \begin{pmatrix} 2 & 6 & -4 & -12 \\ -1 & -3 & 4 & 14 \end{pmatrix}$.

- (a) Solve $A\vec{x} = \vec{0}$ in parametric vector form.
- (b) Give the solution set of $A\vec{x} = \vec{0}$ as the span of some vectors.
- (c) Give a linear dependence relation for the columns of A .

2. (5 points) For which values of h are the following column vectors linearly independent?

$$\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}, \begin{pmatrix} 4 \\ 5 \\ 6 \end{pmatrix}, \begin{pmatrix} 7 \\ 9 \\ h \end{pmatrix}$$

(For fun) Consider the transformation $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ defined by $T(\vec{x}) = \vec{x} + \vec{b}$ with $\vec{b} \in \mathbb{R}^3$ a non-zero vector. This transformation represents translation (a shift of space) in the \vec{b} direction. Show that it is not a *linear* transformation. (As in, demonstrate a violation of at least one of the linearity properties.)