Linear dependence; a set of vectors $\mathbf{x^1}, ..., \mathbf{x^n}$ is linearly dependent

- if there exists a vector $\mathbf{x^j}$ that can be expressed as a linear combination of the other vectors, i.e.
- if the only solution to $\sum_{i=1}^{n} \alpha_i \mathbf{x}^i = 0$ is for all $\alpha_i = 0$.

Intuition for what the determinant $|A|$ is;

- Volume of the transformation of the matrix $A$ up to a sign change.
- if det $= 0$, volume $= 0$. At least one dim collapsed, lost information.

det(AB) = ; det(A)det(B)
det$(A^T)$ =; det$(A)$.
det$(A^{-1})$ =; $1/det(A)$.
Pseudo inverse;

- $A^\dagger = A^T(AA^T)^{-1}$
- for a non-square matrix $A$ such that $AA^T$ is invertible.
- Satisfies $AA^\dagger = 1$, so also called right-inverse.