

- matrices are used to solve simultaneous equations
 - column vectors of matrix detail how the unit vectors transform.
- ⇒ How do matrices affect space and how can they be combined?

Matrices manipulate space linearly: they stretch, rotate and invert; they do not warp space (unevenly distribute it).

Matrices act as the multiplication of the vector-sum of the transformed bases.

$$Ax = s,$$

$$\begin{aligned} x &= \alpha \hat{i} + \beta \hat{j} + \dots + \hat{z} \\ &= \alpha \begin{pmatrix} 1 \\ 0 \\ \vdots \\ 0 \end{pmatrix} + \beta \begin{pmatrix} 0 \\ 1 \\ \vdots \\ 0 \end{pmatrix} + \dots + \begin{pmatrix} 0 \\ 0 \\ \vdots \\ 1 \end{pmatrix} \end{aligned}$$

$$Ax = \alpha A\hat{i} + \beta A\hat{j} + \dots + \hat{z} A\hat{z}$$

All you are doing is,

