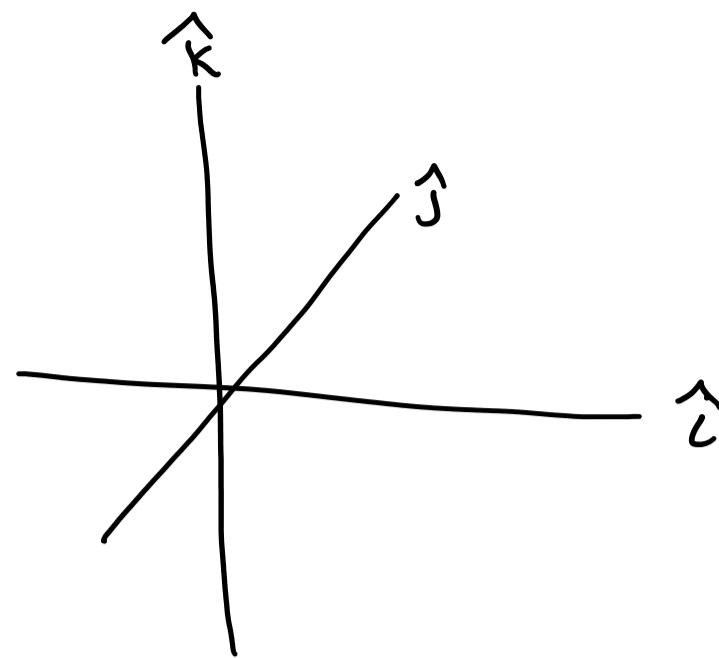


# Three Dimensional Linear Transformations

пятница, 29 марта 2019 г. 23:26



Can be represented as  
a  $3 \times 3$  matrix

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$$

A three dimensional transformation is the re-expression of a vector (a collection of scaled basis vectors), in a way that mutates the underlying basis vectors.

Input vector

$$\underbrace{\begin{bmatrix} 0 & 7 & 3 \\ 1 & 2 & 3 \\ 2 & -1 & 4 \end{bmatrix}}_{\text{Transformation}} \underbrace{\begin{bmatrix} x \\ y \\ z \end{bmatrix}}_{\text{Input vector}} = \underbrace{x \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} + y \begin{bmatrix} 7 \\ 2 \\ -1 \end{bmatrix} + z \begin{bmatrix} 3 \\ 3 \\ 4 \end{bmatrix}}_{\text{Output vector}}$$

Output vector.

## Composite 3-dimensional Linear Transformations

$$\underbrace{\begin{bmatrix} 0 & -2 & 2 \\ 5 & 1 & 5 \\ 1 & 4 & -1 \end{bmatrix}}_{\text{2nd Transformation}} \underbrace{\begin{bmatrix} 0 & 1 & 2 \\ 3 & 4 & 5 \\ 6 & 7 & 8 \end{bmatrix}}_{\text{1st Transformation}}$$

Matrix is used to transform the individual components of a vector into their new represent. and summatively represent the original vector in a transformed state.