Matrices

I now attempt to redefine everything we have already discussed with matrices in terms of linear transformations, and show the parallels between the computational and conceptual lines (intentional pun) of thought. Perhaps linear maps will help us find direction (pun) in our computations.

A vector in $\mathbb{R}^n$ will be expressed as a column matrix with dimension $n \times 1$. A collection of vectors (with the same number of elements) will be expressed as a rectangular matrix composed of column vectors.

Define V_i as the set of standard basis vectors for domain V. Associated with each map T will be matrix M, defined as $[T(V_i)]$. This set of vectors will be the standard basis for im T.

For vectors $\vec{v} \in V$ and $\vec{w} = T(\vec{v})$, *define* matrix multiplication as the operation such that $Mv = w$.

Huh?

Alright, after navigating through all those definitions, let's find our way back with a sample map (pun). $T : \mathbb{R}^3 \to \mathbb{R}^3$.

$$T : \begin{cases} T(i) = 1i + 2j + 3k \\ T(j) = 1i + 1j + 4k \\ T(k) = 0i + 1j + 0k \end{cases}$$