

Inverses?

$$\begin{aligned}Mv &= w \\M^{-1}Mv &= M^{-1}w \\v &= M^{-1}w\end{aligned}$$

That makes some sort of sense—there's a matrix M^{-1} that is the inverse of our matrix multiplication. That means there's a T^{-1} associated with M^{-1} that's the inverse of our transformation.

Wait, multiplying rectangular matrices?

Composition!

$$M_1M_2v = T_1(T_2(\vec{v})) = (T_1 \circ T_2)(\vec{v})$$