

Challenge: In our particular context, there is nothing mathematically distinguishing a point from a vector. To say that we should interpret an object as a Point in an Affine Space, we would say that the object is a member of the set of Points, and vice-versa with Vectors. Amongst Affine Spaces where the set of Points **is** the set of Vectors, there is no way to distinguish between the two. Further, there is no such concept that I am aware of as "casting" in mathematics. A natural way to express this, I think, is stating that there is a morphism between the sets and applying it, but, again, that is not applicable here since they are the same set.

Define H,S : Coordinate Frame on \mathbb{R}^1 Define W : Coordinate Frame on \mathbb{R}^3

Let π_i denote projection

Define hardware-clock-time : \mathbb{R}_H^1

Define msg : $\mathbb{R}_H^1 \times (\{x \in \mathbb{R}_W^{3 \times 3} | \forall i,j, x_i \cdot x_j = 0, \|x_i\| = 1\} \times R_W^3)$

Set msg := (hardware-clock-time, $\pi_2(msg)$)

Define ros-time-base : \mathbb{R}_S^1

Define ros-time-base-alias : ?