On Geometric Origins and Spatial Transformations Between *N*-Dimensional Spaces

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Introduction

Here I will be explaining a geometric system for transformations between geometric spaces with varying dimensions. This will be done through a geometric concept of n-dimensional spaces from $n \to -\infty$ to $n \to \infty$.

Notes on term usages

The following groups of terms will be used interchangeably, where the proper term is in bold:

1. Space, Geometric Space, ***N*-Dimensional** (**Geometric**) **Space**.
2. Axis, **Rigid Body**.
3. Transformations, Transformation Functions, **Geometric Transformation Functions**.

Part 1: Definition of ε (The Smallest Number)

Before we begin with the geometric definitions I will define ε as x/∞ and ε is not 0 in the sense of nothing but 0 in the sense of infinitly small nothingess, we will call this a **Singularity**. This is the “Smallest Number” such that we may add it to ε (0 in the sense of a value) forever and never reach or pass 1, while maintaining a linear rate of increase. This allows us to have a 2d shape in a 3d space without it being non-existent. Here we will be using ε for a spatial 0 and 0 for a state of non-existence.

Part 2: Definition of a Point and The Universal Origin

To begin we must first define what a point is. A point is the fundamental unit of geometric spaces. A point is an *n*-dimensional space with $n = 0$. It can also be thought of as a geometric space, where the rigid bodies of n have collapsed, i.e. is being viewed externally (defined later on). We also define the $n = 0$ geometric space as a point.

We will now define the **Universal Origin** (represented by the archaic Greek letter koppa (Ϙ)) as the $n = 0$ geometric space. We denote the origin of a geometric shape *A*, in *a* *n*-dimensional geometric space, with $Ϙ_A$, and the every point as $Ϙ_V$ where *V* is a *n*-dimensional vector in the current geometric space. A geometric spaces origin is denoted as $Ϙ_S$.

Part 3: Definition of A Line, Definition of A Geometric Space's *N*-Dimensional Rigidity Axiom and ገ

A line is defined by Q_{V1} and Q_{V2} where $V1 \neq V2$, where *V2* and *V2* are vectors. A point's vector has infinity many fields.

An *n*-dimensional geometric space has *n* many non-zero **Rigid Bodies**. These Rigid Bodies are lines that intersect Q_S. These non-zero rigid bodies are the dimensions of a space and establish coordinates for a point's vector value such that we may combine them with the rigid unites to create our spatial vectors. We also establish that all spaces have infinity many zero valued rigid bodies, but a point's spatial vector is defined by the space's non-zero rigid bodies, i.e. a point's spatial vector is a subset of it's **Point Vector**. The fields that are "hidden", i.e. not present in a point's spatial vector, shall be referred to as a **Hidden Point Vector Field**, and the fields this does not apply to shall be referred to as a **Visible Point Vector Field**.

<u>DEFINE NEGATIVE INFINITE N DIMENSIONS HERE!</u>

We will also define a geometric space that is the combined "sum" of all spaces. This space we will call ገ. This is where all point vectors exist, i.e. every point that can be encountered exists in this space along with its spatial vector's point vector form. ገ has infinitely many rigid bodies (**Axes**).

Part 4: Geometric Transformation Functions

A line, and therefore also a Rigid Body, may not be the same between two given spaces and/or geometries. This can be shown by defining a set of **Geometric Transformation Functions** from an $n=2$ space $S_{E\ x\ sine}$ to a euclidean geometric space.

Before beginning we must define how a set of Transformation Functions works and what its domain and co-domain. The inputs (domain) of a point's Transformation Function is the point vector and with an output (co-domain) of a point vector. The changes may also shift a visible point vector field into a hidden point vector field.

First we will label its geometric axes x_S and y_S, and the Euclidean geometric axes x_E and y_E. Now we define the functions: $y_E = \sin(y_S)$ and $x_E = x_S$. The generalized definition of Geometric Transformation Functions is $a_{S2} = f_a(a_{S1})$, where a is an axis.

Observation 1: The Nature of Information Destruction and Potential Increase in Transformations Between $N_1 \neq N_2$, *N*-Dimensional Spaces

Now let us define a space *A* and a space *B*, where $n_A = 3$ and $n_B = 2$. Now here we run into an issue: the space *A* has **more** dimensions than *B*. In order to transform a sphere (*O*) that resides in *A* into *B*, we must define our Transformation. First we will use the dimensions x_A, y_A, z_A for *A* and x_B, y_B for *B*. Now the functions we define will be $x_B = x_A$ and $y_B = y_A$. (The hidden point vector field transformation is excluded here and will be explained below.)

Now if we want to send the the spatial vector of this point to another person they will have no-idea of the original shape of *O*, as it could have been a cone or a cylinder with infinity many differences. If they want to move it into a higher n-dimensional space they must account for all of these possibilities. Now that one one dimension has been **lost** we must use a **Potential** field for one spatial vector if we move to a higher *n*-dimensional space to represent all variances or *O*. Now if we want to restore it to its $n = 3$ state we must define the Transformations: $x_A = x_B$, $y_A = y_B$, $z_A = P$, where P represents all potential values of O's spatial vector field *z*. One of the values of z_A we would get would be ε, which is the 3d form cirlce we were trying to restore to a sphere.

Here we see that with spatial vectors there is a collapse and loss of vector data that can not be restored, when moving a shape into a dimension of a lower *n* value. This is opposed to point vectors that exist only in ղ.