Motion Fundamentals

Thomas Kirk

I was asked by the Editor to respond to comments by the editorial referee on my article, "Derivation of Reciprocal System Mathematics", and also to comment on K.V.K. Nehru's article, "On the Nature of Rotation and Birotation." I was surprised to find that the primary concerns from the referee and the most unusual assertions by Nehru extended from a very fundamental level of *Reciprocal System* development. Though there is some considerable overlap of subject matter between the two, it is necessary to discuss each separately due to the profound importance of the issues and the danger of confusion if subjects are intertwined. KVK Nehru's paper is discussed in a separate article.

1 Postulates

Larson clearly established the foundation of his system of theory by adopting his famous postulates. The referee feels that they are not postulates but assumptions. Certainly the two words are close to the same meaning, but there is an essential difference.

A postulate is accepted as true without proof, and as such can form the basis for further definitive development. The theory extended will be complete within itself, being able to stand alone on its own irrefutable foundation, the postulates. An assumption is subject to error, therefore it can not be used as the basis of a final development. For example, two parallel lines are postulated in geometry to never intersect. Without this postulate, the theorems of geometry would have an uncertain foundation. If it were an assumption, the theorems of geometry would be of uncertain validity.

I personally never had trouble with this idea within Larson's framework, because Dewey structured his postulates as such, and therefore whatever developed from them was valid within his theory. "Postulates are justified by their consequences, not by their antecedents, and as long as they are rational and mutually consistent, there is not much that can be said about them, either favorably or adversely."[1] Any non-conformance with these postulates would prove the theory incorrect, and if one were to change the postulates one would have a new theory, not Larson's *Reciprocal System*. Therefore, the postulates must remain as such, at least until someone derives them in more detail from a more fundamental basis (or KVK Nehru rewrites RS). I will let the reader decide, postulate or assumption?

2 Natural Progression

Now on to the postulates themselves and the first key feature, the natural progression. In the past, I assumed a basic understanding of the natural progression was common among ISUS membership. To my astonishment, the referee did not understand that, the natural progression, "the basic undifferentiated motion outward at unit speed, one unit of space per unit of time, is the equivalent of *nothing at all*."[2] (italics are Larson's) We see the emphasis here; not only is the word "nothing" in italics, but he goes on to further emphasize this point by saying "at all," non-scientific a phrase as it is. The referee questioned that unit motion was equivalent to nothing, yet it definitely is.

It seems the root of the confusion is that someone unfamiliar with RS would assume that non-motion is

1 Larson, Dewey B., *Nothing But Motion*, p. 30.
2 Larson, Dewey B., *Quasars and Pulsars*, p. 24.

closer to nothing than motion. There would be an identity problem here. Nothing cannot equal both motion and non-motion. This overlooks the fact that non-motion does not exist. What is commonly viewed as non-motion is a relative vector quantity between two objects. In any such case, relative to the broader reality, both objects have an inherent speed of one unit of speed recession, and relative to the local inertial system of the galactic group normally at least a few thousand miles per hour. In fact, relative to the natural reference system, the natural progression, two material objects moving at zero relative inertial speed, are actually moving inward at unit speed in two scalar dimensions and outward at unit speed in the third. We see that nothing is unit-motion, the real state of absence of phenomenon, while non-motion cannot be found.

At this point let's look at the natural progression. Space is not nothing; neither is time. They are aspects of the single entity, motion. Together in the simplest 1:1 relationship, space and time being absolutely inverse, nullify each other and what really exists is purely unit motion which is nothing. This was the original and most fundamental discovery of Larson. It seemed obvious to me that unit motion was nothing from the first time I read one of Larson's works in 1972. It can be no other way within his theory.

3 Motion Definition

Much of the difficulty encountered by the referee extended from the de facto definition of motion as used in the postulates and this same definition used in my development of the mathematics. Larson used the term motion in the most basic sense as the referee clearly recognized wherein he substituted the word basic in front of the word motion in marking my article. Since Larson did not present a definition, I did not presume one either. Apparently Larson felt that such a definition was not necessary, because the nature of the motion described by the postulates was self evident within the principles established by the postulates themselves. I believe he was right, because it always worked for me. It evidently has not worked so well for others.

Therefore, I propose a definition, more as an aid to understanding that as a necessity, as follows:

> Unless otherwise specified, motion is one simple independent most fundamental magnitude.

This clarifies that when we speak of a motion in the development, it means motion in one scalar dimension and not the superposition of motions in two scalar dimensions, such as the balance of recession and gravitation. Here is a profound concept that Larson never broached, because he did not see scalar dimensions in their proper light. Also any combination of vectorial motions, such as the relative zero speed discussed earlier in this paper, is not motion as discussed in the development. Only s/t, $1/n$ or $n/1$, motions in one scalar dimensions are considered at this level of development. Motion combinations of multiple scalar dimensions and inertial system vector sums are compound motions which will be dealt with well after the basic theorems are developed.

This understanding takes care of the referee's concerns that other motions than $1/n$ or $n/1$ exist, in contradiction to Theorem 2. Likewise adding unit motion, as in the proof of Theorem 3, does not change the value of the original motion, though by a combination of vectorial manifestations of motion in two different scalar dimensions, a vectorial change can result in the 3-d reference frame. This is seen in the modification of gravitational net vectorial motion by the unit motion in the independent scalar dimension of the recession. This superposition effect was pointed out by the referee, but this combination of motions is outside of the definition which is now established and fully implied in Larson's Postulates. The referee points out that a combination of motions can yield a vectorial motion

of m/n. This is impossible for one single most fundamental motion in one scalar dimension as Theorem 7 establishes. "Thus the deviation from the normal rate of progression may take place either in space or in time, but not in both coincidentally. The space-time ratio, or speed, is either $1/n$, or $n/1$."[3]

4 Rotational Displacements

The referee asked me to clarify whether I am talking about translational or rotational displacement in connection with Theorem 2. Rotational displacements do not fall within the definition of motion used within the postulates and within the RS mathematics development. Actually, *all displacements are unidirectional*. Rotation is always the result of a combination of motions manifested as rotation by special circumstances other than the single displacement itself. Rotation is never a pure displacement. It is always the result of a combination of motions, often of varying kinds and often in a different scalar dimensions.

Production of a rotation is often similar to the apparent vectorial motions that manifest in 3-d space due to combinations of superimposed independent motions as discussed above. In other cases as exemplified by the inherent motion of the photon (not propagation), a motion with a specific direction is distributed to all directions across the unit space or unit time boundary. The interplay of this property in combination with other unidirectional displacements yield a rotational manifestation. The displacement which yields a rotation is indeed a displacement, but the exact nature of the action involved which causes the rotational manifestation has never been published.

Consider how gravitational motion is linearly inward, yet it arises from what has been referred to as a "rotational" displacement. This is the inverse perspective on the true circumstances where the unidirectional gravitational displacement has a rotational manifestation. So of course its outcome in space remains linear. No reasonable explanation of this has ever been presented.

The answer to how a linear gravitational motion displacement can manifest as rotational can be found in the study of electromagnetism. The circulating field lines around a linear current are a phenomenon of a closely related kind. There is clearly no rotational motion involved in the motion of a linear current which yields the circulation or rotational motion of the magnetic field. Therefore, when we speak of displacement, we are always talking about $1/n$ or $n/1$ unidirectional displacements.

Also consider that all rotation of material objects in space is at any moment in time a combination of linear motions acting on the atoms of the object. Orbiting bodies have tangential velocities and gravitational motions, both of which are linear yet yield the net rotation. This is the case for all rotation. A pure moment does not exist, all moments are created by torques; linear motions arranged in space to produce a net rotation. Within a rotating object, each atom has tangential speed coupled with linear centrifugal forces through its atomic bonds that yield the rotation. So it is true on the level of displacement of the photon that produces the rotational base and mass increments in general, but by mechanisms totally different than torque or centrifugal force.

5 Miscellaneous

The only other comment from the referee concerns Theorem 5: $n/1 + m/1 = (n + m - 1)/1$. The referee's difficulty may extend from a typographical error in the first line of the proof: Total displacements are $n + m - 2$ (Postulate 2A). The "-2" in this equation was inadvertently deleted. We know from Theorem 4

3 *Ibid.*, p. 75.

that a motion composed of n-1 displacements has a total speed of n/1, or the displacements plus one unit. Therefore, ($n + m$ - 2) + 1 equals ($n + m$ – 1)/1, agreeing with Theorem 5.

This completes the referees concerns, but there is one other item that should be modified in the RS math development. The definition of "dimensional units" should have been included in the development as presented, because unless the reader was familiar with Navarro's article the definition would be unknown. I neglected to do this, because I accepted Navarro's definition, but it really should have been published in my article also for the sake of the reader. However, after more consideration, I believe the postulates include this concept, so it is unnecessary. Postulate 2C implies the continuity of dimensional units, so this whole concept need not be presented at all.

I would like to present the complete rigorous development of RS math to this point to provide for the correction of typographic errors and elimination of unnecessary text. It will also facilitate the study of this article by those without a copy of the previous article:

Postulate 1A:

> The physical universe is composed entirely of one component, motion.

Corollary 1A.1:

> The absence of any phenomena or "nothing" is equivalent to motion, because the physical universe encompasses such realms of non-phenomena.

Postulate IB:

> Motion exists in 3 dimensions.

Postulate 1C:

> Motion exists in discrete units.

Corollary 1C.1:

> The minimum motion is one unit.

DEFINITION:

Two quantities, n and m, are reciprocal when related by the expression n/m wherein their relation is directly inverse proportional.

Postulate ID:

> Motion has two reciprocal aspects, space (s) and time (t).

Corollary 1D.1:

> Motion is either t/s or s/t. (There being no postulate to the contrary.)

The second postulate is actually 3 postulates:

Postulate 2A:

> The physical universe conforms to the relations of ordinary mathematics.

Postulate 2B:

> The primary magnitudes of the physical universe are absolute.

Postulate 2C:

The geometry of the physical universe is Euclidean.

Theorem 1: The absence of any phenomena, "nothing", is unit motion.

Proof: Nothing is motion (Cor. 1A.1) Minimum motion is one unit (Cor. 1C.1) Therefore, nothing is unit motion.

Theorem 2: Motion only exists as $n/1$ or $1/n$, where n is an integer.

Proof: Motion only exists in discrete units (Pos. 1C). Motion is s/t or t/s (Cor. 1D.1). Therefore, motion, either t/s or s/t, only exists as n units or from an inverse reference $1/n$.

Theorem 3: $1/n + 1/1 = 1/n$ and $n/1 + 1/1 = n/1$

Proof: Nothing is unit motion (Thm. 1) Adding nothing does not change the value. (Pos. 2A and 2B)

DEFINITION:

Displacement is the number of units of motion greater than unit motion that are contained in a single motion.

Theorem 4: Each motion $n/1$ is composed of n-1 displacements from the minimum motion plus the minimum motion, 1/1.

Proof: Nothing is 1/1 (Thm. 1). Increasing motion to $n/1$ units requires addition of n-1 units (Pos. 2A and 2B)

Theorem 5: $n/1 + m/1 = (n + m - 1)/1$

Proof: Total displacements are $(n\text{-}1) + (m\text{-}1) = n + m - 2$.
(Pos. 2A) $\{[(n + m) - 2] + 1\} / 1$ is the total motion
(Thm. 4) $\{[(n + m) - 2] + 1) / 1 = (n + m - 1) / 1$ (Pos. 2A)

Theorem 6: The sum of the displacements of two motions equals the displacement of the sum of two motions.

Proof: The displacements of two motions, $n/1$ and $m/1$ are n-1 and m-1, respectively. (Thm. 4)
The total of the displacements of the two motions is $(n\text{-}1) + (m\text{-}1)$ or $m+n\text{-}2$ (Pos. 2A)
The total of two motions $n/1$ and $m/1$ is $(n + m - 1) / 2$ (Thm. 5)
The displacement of motion $(n + m - 1) / 1$ is $(n + m - 1) - 1$ or $n + m - 2$ (Thm. 4 and Pos. 2A)
Therefore, the displacement of the total motion and the sum of the displacements of the two motions are the same.

Theorem 7: The displacements of two motions $1/n$ and $m/1$ can not be combined into a single motion.

Proof: $1/n + m/1 = (m+\text{l-l})/(n+\text{l-l}) = m/n$ (Theorem 5)
A motion m/n can not exist. (Theorem 2)

Theorem 8: c multiplied times a motion equals $[c \times n - (c - 1)] / 1$ where $n/1$ is the motion and c is an integer.

Proof: $c \times n/1$ = the sum of $n/1$ added c-1 times to a cumulative total beginning with $n/1$. (Pos. 2A)
$2 \times n/1 = n/1 + n/1 = (n + n - 1)/1 = (2n\text{-}1)/1$ (Pos. 2A & Thm. 5)
$3 \times n/1 = (2n\text{-l})/\text{l} + n/1 = [(2n\text{-l}) + n\text{ -1}]/1 = (3n\text{-}2)/1$ (Pos. 2A & Thm. 5)

$$c \times n/1 = [(c\text{-}1)n - 1]/1 + n/1 = [(c\text{-}1)n + n - 1]/1 = [c \times n - (c\text{-}1)]/1 \text{ (Pos. 2A \& Thm 5)}$$

Theorem 9: $c \times 1/n = 1/[c \times n - (c\text{-}1)]$ where $1/n$ is a motion and c is an integer.

Proof: There is nothing in the postulates to indicate which reciprocal aspect is in the numerator of a motion $n/1$ or $1/n$; it is therefore completely arbitrary. As such Theorem 8 applies to both t/s or s/t motions of $n/1$ and an integer times such a motion will have the same numerical resultant in either case. The choice to invert the resultant of the multiplication is again strictly arbitrary. (Cor. 1D.1)

It is exciting to imagine a rigorous development continuing in the same incremental way to include all phenomena in the physical universe. Much like the development of geometry, one that can be continually refined by advocates to maximum solidity and also withstand the most concerted adversarial investigation by advocates to strengthen the development in weak areas. I am already taking the next advance to 4 more theorems which will rigorously establish more fundamentals about the nature of displacement. Actually, essentially everything other than the natural progression is displacement, therefore nearly all the later theorems will deal with the nature of displacement in various circumstances.