Unary Law Corollaries
(And Unit Object)

Contents

Recap & Introduction

The concepts of Pico-physics are developed by revisiting such basic concepts as numbers, units, observer & measurements in light of knowledge that is available to us on these subjects. The objective of the analysis is to provide a basis to integrate; the basic facts like three dimensions of space, concepts of Konservation, Knergy, concepts enshrined in mechanics, relativity, electrodynamics, quantum, nuclear and astronomical physics into a harmonious logic.

Pico-Physicists start his journey by understanding continuously changing interpretation to human observations as changes in power to observe. We have discussed previously the importance of human intuition, abstraction and speculation in observation. Subject Selection, Object Identification, Experiencing the subject, Recording, Cross-fertilization, Measurement, Communication and External Cross-Fertilization as elements of an observation has been discussed. As knowledge about the universe as well as memorizing capability of observer is enhanced, the limitations on power to observe are reduced. He also appreciates natural limits on what is observable. This natural limitation can be ascribed to observed identity or the observer. When ascribed to observer it is seen as limit on units available for observation. When ascribed to object, it is assigned to describe the identity. With this understanding, basic concepts embedded in contemporary physics are re-evaluated with current knowledge of nature. This processes understands and evaluates the basic assumptions about nature that mankind has made to communicate knowledge & give a meaning to human experiences.

Nature is not divisible. It is neither progressive. So it can not be selectively applied to an observed event. To help gradual application of learning about the universe, concept observers are hypothesized. Pico-Physics defines some concept observers similar to Newtonian frame of reference with specific relationship to objects and observers. These are;
    1. Internal Observer

2. External Observer
3. Independent Observer
4. General Observer

The observation is finally a record of experience of the object. Quantitative records use a number together with a unit. The set of numbers available to be used in record of observation is a subset of transfinite numbers from Set Theory. The member of subset can be qualified using expression

$$_R\omega^N$$

R – Number represents the magnitude

ω^N - Represents the unit

N is infinite order of reality (Object observed)

The difference in adjacent transfinite numbers is constant, while in subset representing quantity above, it depends on level (first number in the set), which can be any non-zero number. When two objects composed of same identity are used in the observation, one as an object and other as unit, for Konserved identity, R is a rational number and real number for non-Konserved identity.

Measurement is processes of conformal mapping between identities in two objects. One of them is taken as a unit and the other as an object for measurement. The identity of unit object may be same or different than that of the object.

Pico-Physics understand the limitations imposed by nature on observers. It makes an attempt to understand the limitations on observations. On understanding these limitations, it transcends these limitations by devising tools that enable modeling, overcoming these limitations;

1. Nature of reality (infinite order)
2. Mapping Conformal & Non-Conformal
3. Finiteness of observer to infiniteness of nature
4. Uncertainties & Pseudo Konservation

The nature of reality is represented by infinite order, and handled using mapping density function between identities belonging to different infinite order.

Summary

The thought processes in Pico-Physics is developed around Unary Law of Pico-physics called 'Unary Law of interaction of matter with space' or in short '**Unary Law**'. We have previously discussed the formulation of Unary Law. It is enunciated in two flavors. The *Definition flavor* '**Space contains Knergy**' defines properties of space with respect to it's interactions with Knergy. The *Assertion flavor* '**Knergy Exists (in space)**' relates to the fact that Konservation denies creation or annihilation in any such interaction. These statements signify the same physical reality i.e; for existence of Knergy the underlying space is a pre-requisite with no reverses pre-requisite for space. In terms of Pico-Mathematics mapping Knergy in Space is **non-conformal**. Revisit to basic concepts

specially the number Infinite, and its use to represent physical quantity enables us to understand the three basic pillars included in Unary law. These are;

1. Three Dimensions of space
2. Continuous drift of Knergy in Space
3. Regenerative Nature of space

Revaluation of concept of Konservation completes the concepts embedded in Unary law. These include;

1. Konservation makes measurements possible
2. Compatibility is required between Science of numbers and Konservation
3. Natural Unit for existence of conserved substance
4. Pseudo Konservation of conventional Knergy
5. Kambhar as enabler to model space-Knergy interactions
6. Basics of Pico-Modeling with Kambhar, Knergy & Space

Unary law defines Space as a container of Knergy with following characteristics which are read as Corollaries of Unary law. These characteristics are;

Corollary #1 - Space has three dimensions
Corollary #2 - Knergy moves at constant speed in space.
Corollary #3 - Time is progressive and unidirectional.
Corollary #4 - Knergy can be freely distributed in space.
Corollary #5 - Space has affinity to possess Knergy
Corollary #6 - Space devoid of Knergy is homogenous

The word 'contain' relates the two identities (Knergy 'finite and Konserved' with Space infinite and regenerative). This relationship can be speculated into various possible **models of the universe of matter & space**. Some of the models have been selected and presented here, to explain the meaning of unary law. Finally we arrives at corollaries of unary law, reflection its different aspects.

Unary law Corollaries

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Linguist ingredients of Unary law are;

1. Space and Knergy are two distinct identities
2. Mapping of Knergy into Space is non-conformal

3. Knergy co-exists with space
4. Knergy do not replace or substitute for space
5. Knergy is Konserved
6. Space is Non-Konserved

Unary law establishes a clear distinction between space and Knergy as separate identities. This excludes the possibility of exclusive existence of these identities as well i.e; existence of Knergy with space surrounding Knergy or vice-versa. The relationship is not 'Space wraps Knergy', the word contain, refers to non-conformal mapping of Knergy onto space. There can not be a situation, where Knergy exists in absence of space. However, the reverse is feasible. The space and Knergy are two separate identities, related to each other by non-conformal mapping of Knergy onto space. The space by itself is independent identity. 'Space contains Knergy' Unary Law defines Space.

Dimensions of Space

2D Space (Required)

Mathematically, a mapping of one substance to another, means associating measurable quantity of substances. This enables finite quantities of one substance be mapped to infinite quantity of another substance. Dimensions represent a way to circumvent this limitation, to eliminate the possibility of such a conformal mapping. This expands the number set available to represent container. The number series, defines the horizon of measurement and mapping. While mapping Knergy to space, the number horizon is limited to Infinite. Thus any finite quantity of Knergy can be mapped to infinite uni-dimensional space. The second dimension of space is therefore required to satisfy containment property of space. 2-D space can contain Knergy.

For any distribution of Knergy in space, still empty space will envelop the space holding Knergy. For this to hold true in all cases, the dimensions of space shall differ by two more from that of Knergy. Konserved nature of Knergy, gives it a null dimension (Zero) in which it is observable. Thus to satisfy the Unary law in respect to non-conformal mapping of Knergy onto space, Space shall have at minimum two observable dimensions.

Third Dimension

With Knergy contained in 2-D space, we have a scenario when Knergy is dispersed in space in isolated islands surrounded by sea of empty space. If it is static, we have a situation, where two identities exist in isolation. One identity space exists alone, and the other Knergy with occupied space as a characteristic of Knergy exist in isolation. This violates unary law of containment. In static distribution, if un-occupied space never comes to posses Knergy, there is no reason to believe it is same as space occupied by Knergy. The word contain is significant in Unary law that denies possibility of static distribution. Thus the occupied space shall be de-possessed of Knergy, to occupy un-used space. This introduces space-Knergy dynamics.

Event & Simultaneity

Interaction between space and Knergy changes topographical distribution of Knergy in space. Since, Knergy is conserved it's position before and after the interaction are related. It is only after de-possession of Knergy at earlier position, new position can be occupied. Thus Knergy must trace a continuous path from old to new position. This possession and de-possession of Knergy are events. Participating Knergy in an observation event can be totalled to provide measure of Knergy. When scope of observation is limited to an object, it measures the Knergy contained in the object. This totalling process should be such that measure of Knergy is constant irrespective of any other variations. The totalling processes, defines an instant as collection of exclusive events with participating Knergy. Exclusive means an event is member of one and only one instant. It is possible to hypothesize, a universal instant that totals up all the Knergy in the universe. All events participating in the instant are simultaneous. Simultaneity is the property resulting from Konservation, and defines, in a way, property of Knergy that occupies space to be measured without ambiguity.

Simultaneity enables Knergy participating in the events to be totaled up to determine total Knergy in existence without ambiguity.

The event sequence follows 'cause & affect logic'. Past events influence present. As future becomes present, present transcends to past and influences the current events. If simultaneity is defined with this thought processes, the set of events will be said to be simultaneous if there is no possibility of them influencing each other.

Time

The dynamics of universe result in a sequential, continuous set of instants. This dynamics is independent of any localization. It provides a reference to observations and measurements on interactions between space & Knergy. This reference is 'Time'. The drift of Knergy defined by 'Contain' links the amount of drift between any two events for all objects to be same.

Time progress is **unidirectional**. Since time and location of object is tied. If it was not unidirectional, there will exist a instant when the unit object is countable twice, once when time is progressing, and other when it is regressing. Thus, Knergy will increase at that instant. This is against Konservation property of Knergy.

Now even the second dimension of space can be occupied for a fraction of time, thus Knergy space mapping is conformal. To keep the mapping non-conformal, space shall have three dimensions. After making allowance for dynamics, the third dimension is a pre-requisite. Thus to satisfy "Space contains Knergy", space shall have three dimensions. Unary law implies three dimensions of Space.

Corollary #1 - *Space has three dimensions*

Continuous Drift

The dynamics is represented by drift of Knergy in space. The Knergy drifts continuously in space. Instant provide a common reference between two objects. If one of them is a unit object and undergoes displacement by amount x, how much

displacement the observed object will undergo? 'Space contains Knergy' includes 'Knergy occupies space'. Thus, events constituting a single instant can not occur at same position is space. Thus there can be no direct answer. We can only say, unless there are any other factors, affecting the drift, the displacement shall be same.

Constant Drift Rate (Speed)

Let us may two different identities time and displacement. At instant I1 a unit object is observed at location L1. The next instant I2, due to continuous drift, it is no more at L1, but a different location say L2. Thus along the continuous path traveled by the object, we have a series of positions. It's presence in each of these positions defines an instant. The gap between starting event and event it is located at L2 is time. For each location, we have a different value of time. Thus there exists a 1:1 Mapping between distance and time from starting event.

Similarly, at any instant other than I1 (starting Instant), separated by time time, we have due to continuous drift, a different location for the unit object. Thus there exist a 1:1 mapping between distance and time.

Hence the mapping between time and distance is 1:1 conformal. That means measure of time and distance is same for unit object. Or unit object moves with a constant speed. Or Knergy moves at constant speed in space.

Corollary #2 Knergy moves at constant speed (unit speed) in space.
Between any two instants, Knergy displacement is same through out space.

The constant speed makes it distribute uniformly over unit object's displacement in space. Uniformity makes it commutative as well as associative. Giving it characteristic similar to that of dimension of space. These characteristics are make it feasible to consider time as a dimension of Space-Knergy system. Time is unidirectional, and continuous drift make it progressive as well.

Corollary #3 Time is progressive and unidirectional.

Constant drift speed, indicate the nature states that mutual & simultaneous measure of space and time. However, when we visualize them to separate and distinct identities (Using reference systems with distance as separation between points as expressed by difference in co-ordinates) the value of speed depends on individual units of distance and time. Till the time, units used express the speed are same, the speed measures to same number.

Modeling Space – Added Conditions

Pico-Physics defines the predominant nature of space is to contain the Knergy. The reason for space to exist is to contain Knergy. So if there is no possibility to contain Knergy, space does not exist. So the dynamics, the drift of Knergy in Space shall be so directed that all of space has a possibility to posses Knergy.

'There exists a possibility to contain Knergy through out 3-D space'.

'Knergy occupies Space' makes room for quantitative measurements on space. By definition Space extends to infinity. On measurement in any of the three dimensions, space is endless. Infiniteness implies non-Konservation - the characteristic that enables creation and annihilation as in $(I = I +_- R)$, Where R is the measure of space created or annihilated. The modeling Existence of Knergy in Space must have room for creation and consumption of Space.

Creation and annihilation is permissible for space.

Space-Knergy Dynamics

As Knergy exists in space, it occupies a part of space. Since space has three dimensions, the measure of space occupied belongs to the number set of third Infinite Order. For space to exist there shall be a finite possibility to posses' Knergy. For 3-D space to have a possibility to posses Knergy thought its existence (Corollary #2), there shall be three processes to move Knergy between regions of space.

First order of infinity can be satisfied by processes of lowering the Knergy density. To make if possible; It shall be possible to reduce Knergy density (Knergy/unit space) to zero. Thus Knergy density can reduce to zero. This is possible when Knergy can be freely distributed. It is only then the Knergy density can be reduced to zero, and one dimension can be provided a possibility to posses Knergy.

Corollary #4 Knergy can be freely distributed in space.

For the balance two dimensions to be satisfied, we need two more processes. With human observation power, it is easy to see one process can be drift of Knergy through space.

The drift of Knergy in space enables another dimension to be covered. Now all of 2-D space has a possibility to come in possession of energy.

Knergy drifts through space

To cover space everywhere with possibility to possess Knergy, we still need one more processes. Non-Konservation provide us the processes that involves annihilation and creation of space. This process can be used to provide all 3-D space a possibility to possess Knergy. As space comes to possess Knergy, it is consumed by it. Since Knergy shall occupy space, space surrounding Knergy moves in to possess this Knergy. This defines the affinity of Space to possess Knergy.

Corollary #5 - Space has affinity to possess Knergy

It is same as Knergy drift in space. Affinity of space to possess Knergy takes care of relative dynamics between two interacting identities. Thus as space comes into possession of Knergy, it is consumed. The affinity of space surrounding Knergy pulls in to replace the consumed space. As per non-conservative characteristic of space, generation of space is a possibility. Let us consider some conditions under which it can regenerate itself.

On being consumed, if it regenerates itself, consumption itself has no meaning. There is no movement of space into Knergy as well. Consumption and creation of space must be

geometrically separated. Then, it provides all sections of space there reason to exist (possibility to posses Knergy). Regeneration means consumption followed by generation of space at geometrically displaced location.

Regeneration is generation following consumption at an independent location.

Since Knergy is continuously drifting in space, it is continuously being possessed by fresh space. Space is in possession of energy till it is consumed. If space was somehow dispossessed of Knergy, and comes to possess Knergy again, on second attempt it is expected to last less than it lasted before. Holding power defines the capacity of space to hold Knergy.

Capacity to possess Knergy is holding Power of Space.

The space, that gets to possess Knergy, holds on to Knergy till it is consumed and replaced by surrounding space in waiting. Thus the processes that make it possible to realize 'Space contains Knergy' are;

1. Distribution of Knergy in Space
2. The constant drift of Knergy through space
3. Regeneration of space

To provide all of space a chance to contain Knergy; Distributed Knergy shall drift through regenerative space.

Regenerative Space has limited power to hold Knergy

Real & Geometric Space

3-D Space exists irrespective of presence of Knergy. Since only property of space is to contain Knergy, space devoid of Knergy or influence of Knergy has no property, which can distinguish adjacent regions of space. Thus space devoid of Knergy shall be isotropic & homogenous.

Corollary #6 - Space devoid of Knergy is homogenous

Presence of Knergy disturbs this uniformity. The unary law 'Knergy exists in space' defines the existence of Knergy in space. The space is said to be occupied by Knergy when it's inclusion in observation leads to increase in Knergy under observation. Thus simultaneity and increase in Knergy measure on inclusion defines occupation of space by Knergy.

Unit (Knergy) Object (Part A)

There exist a natural unit for Knergy. A Knergy content of an object is an integral multiple of this unit. It is also possible to conceive of an object that measures to the unit itself. This is Unit Object.

As soon as unit object is visualized to exist in space, it introduces a singularity, breaking isotropic characteristic of space, with a preferred direction taken from constant drift. This introduces cylindrical symmetry to the situation. Since further division is not possible, unit object acts like a point object. It thus identifies a singular point in space. The singular point along with direction creates a cylindrical frame of reference attached to the Unit object.

Attached to this cylindrical reference system, we can consider two concept observers, one internal and another external.

External Observer & Unit Object

To the external observer, space at two ends of the unit object, has differing holding Power. One in front (AB) has full holding power, while Knergy has consumed all the holding power of space at opposite end (CD). Line CA now plots the holding power along the length of unit object.
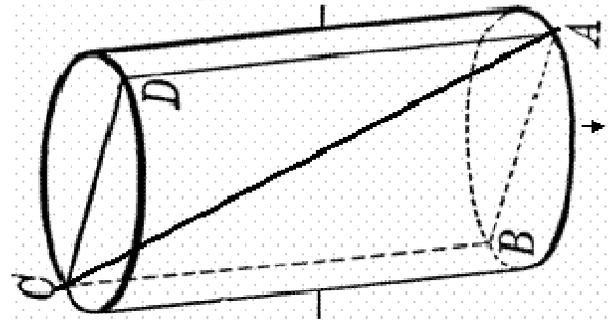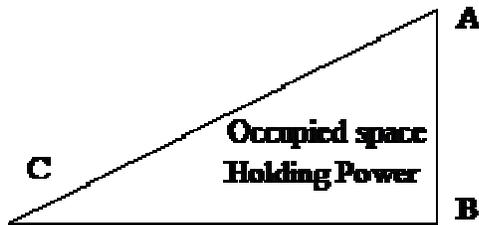
Line CA now plots the holding power along the length of unit object. The holding power of space

along drift direction can be plotted with respect to position of unit object. The three cases for discussion are given in the picture to the Right.

Case I: Holding power to the left of unit object is nil, while to the right is full – holding power in free space Hfs. Thus we have space which can not hold Knergy to the left. This defines space with Holding Power. Holding power is than reality and space the result.

Case II: When space losses its holding power it is lost and replaced by newly created fresh space. Here to the left and right of unit object, holding power is same. Thus presence of unit object has no affect on space. Here the disturbance created by presence of Knergy in space, is limited to occupied space. Space not occupied, is not affected by presence of Knergy nearby.
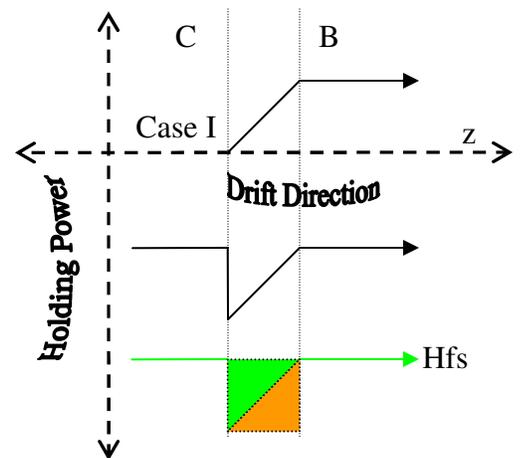
Case III: Due to affinity of space to possess energy, free space across the cylindrical surface moves into the unit object as the occupied space looses the holding power. The result is, within the unit object, holding power of space is (uniform-geometrically) same as outside. Only part of it is free, and rest is occupied. The contribution of free space increases to 100 percent at the trailing edge of the unit object. The occupied space ,can now disappear since it has no holding power left. Thus holding power of space is constant through the unit object in the drift direct. The space traced by the unit object is ready for occupation by Knergy.

In this case, while space is consumed inside the unit object, it is generated outside the object, from where it moves into the object due to its affinity to posses Knergy. Inside the object, half of space is occupied by the object and rest is free space. So following is satisfied;

1. Unit Energy Object floats through the space
2. Space affinity to possess Knergy is satisfied
3. Unary law space contains Knergy is satisfied

Case III is seen to be consistent with Unary law 'Space Contains Energy'.

Intuitively, the holding power of space can be defined with respect to mapping density of Knergy in space and rate of consumption of containing space.

$$H_S = K_D \Delta t$$

Where H_S is Holding power of space, and K_D is Knergy density, Δt represents the gap between instant the space is occupied by Knergy and released (consumed) by Knergy.

Let us see, the affect of variation in K_D on unit object. If the holding power of space is constant, the change in Knergy density results to change in length as below;

Length of unit object along the direction of drift;
$$= H_S C_S / K_D$$
where C_S is constant drift speed of unit object in space (or speed of light in free space).

The cross sectional area of unit object across direction of drift can be calculated as;

Knergy content of unit object = Density X Volume (AXL) = 1

Cross section area of unit object = $1/(H_S C_S)$

In normal case, both H & C are constant, and hence the cross –sectional area of unit object is invariant with respect to change in Knergy density. It does not depend on the space occupied by the unit object.

Unit object is symmetrical about drift-direction and its dimension in drift directional is inversely proportional Knergy density.

Discussion Results

Unary law is enunciated in two flavors. The *Definition flavor* '**Space contains Knergy**' defines properties of space with respect to it's interactions with Knergy. The *Assertion flavor* '**Knergy Exists (in space)**' relates to the fact that Konservation denies creation or annihilation in any such interaction. There are six important corollaries to unary law. These are;

Corollary #1 - Space has three dimensions
Corollary #2 - Knergy moves at constant speed in space.
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Corollary #6 - Space devoid of Knergy is homogenous

Knergy, due to Konserved nature has no dimension (Zero infinite order identity). In observation it is a constant quantity (Invariant). It has a natural unit of measure. An object (Space containing unit Knergy) continuously drifts in space with a constant speed. Unit object possess cylindrical symmetry. It's size is determined by its spatial measure along the drift direction (length). The length is inversely proportional to Knergy density in the point object.