Mathematics of Embedded Infinities

Ralph C. Ennis
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DRAFT

AGENDA

1 – Descriptors of Infinities and Embedded Infinities

- 1.1 Ontology of I and EI
- 1.2 Special Categories of EI

2 – Dynamics of Embedded Infinities

- 2.1 Density
- 2.2 Basic Operations
- 2.3 Strength of Connectivity

3 – Applications Embedded Infinities

- 3.1 Mirroring across Spaces
- 3.2 Physical Space
- 3.3 Interpretative Space
- 3.4 Cluster Networks and eDNA
- 3.5 Non-Identical Unbounded EI
- 3.6 Symbolic Reasoning

This paper is a DRAFT.
Much work is needed to increase clarity, eliminate all inconsistencies and extend these ideas across all variations of infinities and embedded infinities.

1.0 – Ontology of Infinity and EI

Infinity (I)

CONSTRUCT of Infinity

- Without a bounded number of elements

ELEMENTS within Infinities

- Types of elements
  - Discrete elements (integers, particles)
  - Continuous elements (reals; waves)
- Elements within an infinity
  - Identical type
  - Similar types (degrees of similarity)
  - Dissimilar types

TYPES of Infinities

- Discrete infinities
  - Uniform discrete
  - Non-uniform discrete (random patterns)
- Continuous infinities
  - Uniform continuous
  - Non-uniform continuous
    (Knots/loops/redundancies on continuum)

BOUNDARIES of Infinities

- Open infinities (non-bounded)
- Bounded infinities
- Bounded-open infinities
  (rays; ray without end-point)

DENSITY of Infinities

- Fully populated Infinities (Real numbers)
- Partially populated infinities (Integers, etc.)
- Empty infinities

DIMENSIONALITY of Infinities

- 2-D and 3-D and n-D
- Empty point with infinite possibilities

Embedded Infinities (EI)

EMBEDDEDNESS of Infinities

- Completely overlapping EI (with identical elements)
- Partially overlapping EI
- EI with dissimilar elements (discrete and continuous)
- Non-embedded Infinities (separate)

MAXIMUM Embedding

- Infinite number of infinities with each embedded
  an infinite number of times

Human Perception of I and EI

AWARENESS of I and EI

- Active awareness of Infinities (in-play of our awareness)
- Passive awareness infinities
  (out of play but within imagination)
- Transcendent awareness infinities
  (beyond play and within mind)
- Non-awareness
  (out of play and outside of current imagination)
- Unknowable
  (out of play and outside of all human imagination)

CERTAINTY of I and EI

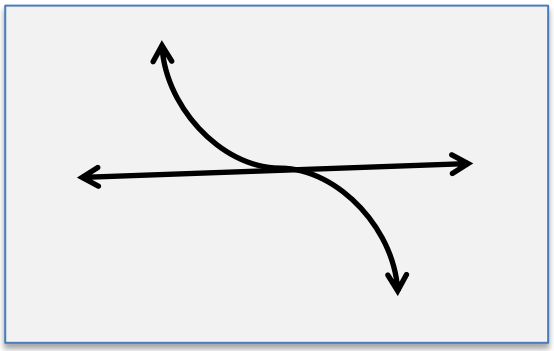
- Non-random and random certainty
- Probabilistic certainty and uncertainty
- Random uncertainty

VISUAL PERSPECTIVES on I and EI

- Objective perspective (outside)
- Encased perspective (inside and surrounded)
- Adhered perspective (on-surface)
- Holographic perspective of infinities
  (projected representation)
- Tetrahedron as a special 3-D case of I and EI

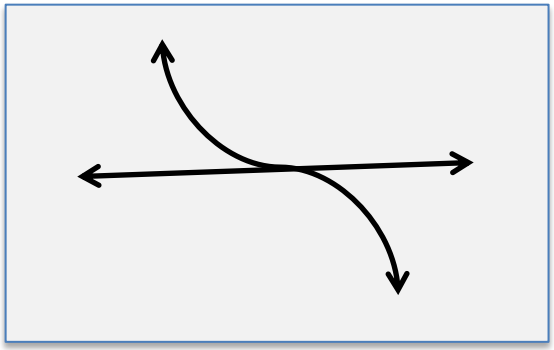
1.2 – Special Categories of EI

Continuous Partially Embedded Infinities – functions (i.e. uniform)



Real Numbers

Discrete Partially Embedded Infinities – functions (i.e. uniform)



Integers

2 – Dynamics of Embedded Infinities

2.1 – Density

2.2 – Basic Operations

2.3 – Strength of Connectivity

2.1 – DENSITY

Density refers to the number of elements within boundaries.

Density of singular infinity: S

- Continuous infinity: S = ∞
- Discrete infinity: S = 1 to least than ∞
  - n = number of elements between a and b where a and b are integers within the infinity and at least one element of the uniform infinity is on or between a and b
  - S = $\left| n/(a - b) \right|$

Densities of multiple discrete infinities: S_1, S_2, S_3 ….

- In order to perform comparisons and basic operations with multiple discrete infinities, a common (a – b) across all those infinities must be establish before calculating densities of each discrete infinity.

2.2 – BASIC OPERATIONS

Since basic operations (addition, subtraction, etc.) applied to an infinity are conceptually problematic …

ADDITION (and subsequently multiplication) is perceived as:

1. Increasing the density within the gaps of discrete infinities (i.e. increasing number of elements and/or frequency of occurance of elements)
2. Frequency of reoccurring elements within continuous infinities (and thus an increase in density by redundancy)

SUBTRACTION (and subsequently division) is perceived as:

1. Separating unbounded infinities into two or more or infinite number of bounded infinties
2. Separating unbounded infinities into infinties each with one boundary and one open end (i.e. ray of real numbers)
3. Decreasing the density of continous infinities thus yielding non-uniform cpntinuous infinites or uniform or non-uniform discrete infinities
4. Decreasing the density of discrete infinities by increasing the gaps between elements

2.3 – STRENGTH OF CONNECTIVITY

Within *embedded infinities*, a basic descriptor can be perceived as determining **strength of connectivity** between the two or more infinities (i.e. number of elements in common over a bounded space).

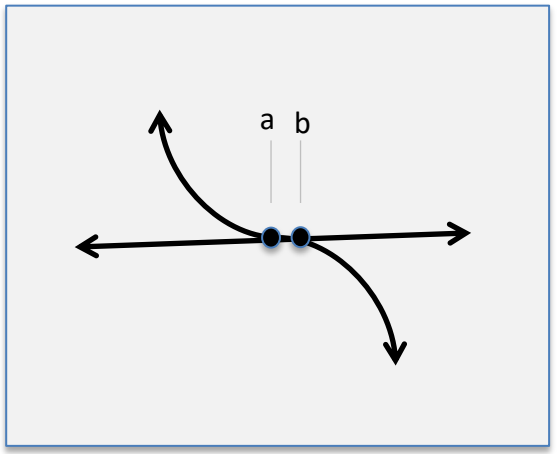
1. Within partially populated **DISCRETE** embedded infinities (e.g. integers), the determination of strength of connectivity across a mutual boundary is calculated based on:
    - Increasing density of elements (filling gaps and/or redundancy between 2 or more EI)

Calculate …

Determine the Strength of Connectivity (C_α) between uniform **DISCRETE** (partially populated) embedded infinities.

Unit density of singular discrete infinity: S

$$S = \left| n/(a - b) \right|$$



- n = number of elements between a and b where a and b are integers within the infinity and at least one element of the uniform discrete infinity is on or between a and b
- For non-uniform discrete infinities, probabilistic means may be estimated.
- Establish common a and b for multiple discrete infinities that will be compared. (a-b) is one unit.

Unit density within embedding: D

$$S_1 + S_2 + S_3 \ldots = D$$

- Uniform density within 2 or more (but not infinite) discrete EI's and common unit (a-b)
- For non-uniform densities (i.e. with random redundancies or variable degrees of separation between elements), probabilistic means may be estimated.

Distance of embedding: d

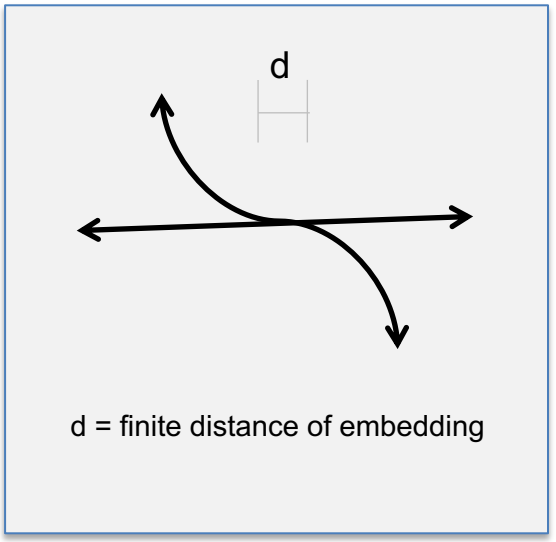
d = 0 to ∞ (unbounded EI distance)

Strength of connectivity (DISCRETE EI's)

$C_\alpha = d \times D = d(S_1 + S_2 + S_3 \ldots)$

where $d \neq \infty$

- Strength of Connectivity = finite distance of embedding x density within embedding



d = finite distance of embedding

2. Within fully populated unbounded fully embedded **CONTINUOUS** infinities (completely overlapping), a strength of connectivity (C) is perceived as:

   $C = \infty$ (e.g. true for Real and integer infinite EI functions.)

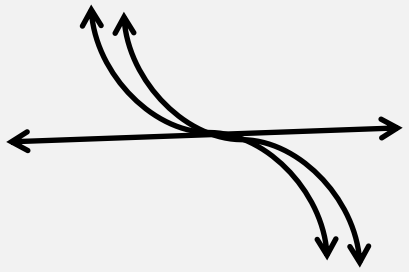
3. Within uniform **CONTINUOUS** partially embedded infinities (i.e. fully populated; real number functions), the determination of strength of connectivity (C_β) across some boundary is calculated based on:
   - Increasing density of elements (through redundancy) over distance of embedding:

Strength of connectivity (CONTINUOUS EI's)

$C_\beta = d \times Q$

where $d \neq \infty$ and

Q = number of EI's, i.e. $Q \geq 2$



Q = number of EI's
(e.g. Q=3 for above)

4. **DISCRETE** and **CONTINUOUS** embedded infinities

- Operations between discrete and continue embedded infinities are problematic due to infinite number of elements in continuous functions. That is, C_{α} is not comparable with or operational with C_{β}.

- How might this problem be circumvent ? (Explore later)
  - Maybe by viewing a Real number infinity as a full ”solid block” (e.g. 1) and subtracting from it the density of a discrete infinity, then arriving at number for density that is assigned a negative.
  - NOT SURE THIS HELPS … explore later

3 – Application of Embedded Infinities

3.1 - Non-Identical Unbounded EI
- Description
- Four Examples

3.2 – Three Dimensional Spaces
- Mirroring across Spaces

3.3 – Physical Space
- Perspectives of Particle through Spacelet
- Three Embedded Spacelets

3.4 – Interpretative Space
- Interpretative Space for eDNA Model
- Overlapping (3) 3-D Axes for eDNA
- 2-D Ethical Interpretive Map
- Cluster Networks and eDNA

3.5 – Symbolic Reasoning
- Analogies of Embedded Infinities

These applied EI require many intuitive leaps. Much work is required in the future for clarity.

3.1 – NON-IDENTICAL UNBOUNDED EI

Description of Non-Identical Unbounded EI

(Special case of EI)

GIVEN:

All the elements of finite set A are contained within both the infinite sets B and infinite set C

AND

All the elements of set B and set C can be generated from the elements of set A

AND

Infinite set B and infinite set C are NON-IDENTICAL

SHOW:

Infinite set B can be derived from infinite set C

AND

Infinite set C can be derived from infinite set B

THUS:

The elements of infinite set B are embedded within infinite set C

AND

The elements of infinite set C are embedded within infinite set B

Four examples follow …

Example One: FOUR and SIX DIGIT NUMBERS

GIVEN:

Set A = elements (0,1,2,3,4,5,6,7,8,9)

Set B = an open infinite set of random generated numbers forming an infinite numbers of 4 digit elements generated from Set A (without delineating commas)

Set C = an open infinite set of random generated numbers forming an infinite numbers of 6 digit elements generated from Set A (without delineating commas)

SHOW:

Infinite set B can be derived from infinite set C

AND

Infinite set C can be derived from infinite set B

AND

Infinite set B and infinite set C are NON-IDENTICAL

THUS:

The elements of Infinite set B are embedded within infinite set C

AND

The elements of Infinite set C are embedded within infinite set B

Example Two: FOUR and SIX LETTER WORDS

GIVEN:

Set A = all letter of the Roman alphabet (a, b, c … x,y,z)

Set B = an infinite set of random generated letters forming an infinite numbers of 4 letter word elements (without delineating commas)

Set C = an infinite set of random generated letters forming an infinite numbers of 6 letter word elements (without delineating commas)

SHOW:

Infinite set B can be derived from infinite set C

AND

Infinite set C can be derived from infinite set B

AND

Infinite set B and infinite set C are NON-IDENTICAL

THUS:

The elements of Infinite set B are embedded within infinite set C

AND

The elements of Infinite set C are embedded within infinite set B

Example Three: ALPHABET and SHAKESPEARE

GIVEN:

Set A = all letter of the Roman alphabet (a, b, c … x,y,z)
Set B = infinite set of “alphabet randomly and infinitely generated” elements
Set C = infinite set of “works of Shakespeare sequentially and infinitely generated” elements

SHOW:

Infinite set B can be derived from infinite set C
AND
Infinite set C can be derived from infinite set B with finite subtractions
AND
Infinite set B and infinite set C are NON-IDENTICAL

THUS:

The elements of Infinite set B are embedded within infinite set C
AND
The elements of Infinite set C are embedded within infinite set B

Example Four: WATER and SPACE

GIVEN:

All the essence of the finite set A “water molecules” is contained in the infinite set B “space”

AND

All the essence of the infinite set B “space” is contained in the finite set A “water molecules”

AND

“space” is not equal to “water” AND “water” is not equal to “space.”

SHOW:

Infinite set B can be derived from finite set A

AND

Finite set A can be derived from infinite set B

AND

Finite set A and infinite set B are NON-IDENTICAL

THUS:

The essence of “space” can be derived from the essence “water”

AND

The essence of “water” can be derived from the essence of “space”

This assumes a spacelet model of matter and space. See section 3.3.

3.2 – Three Dimensional Spaces

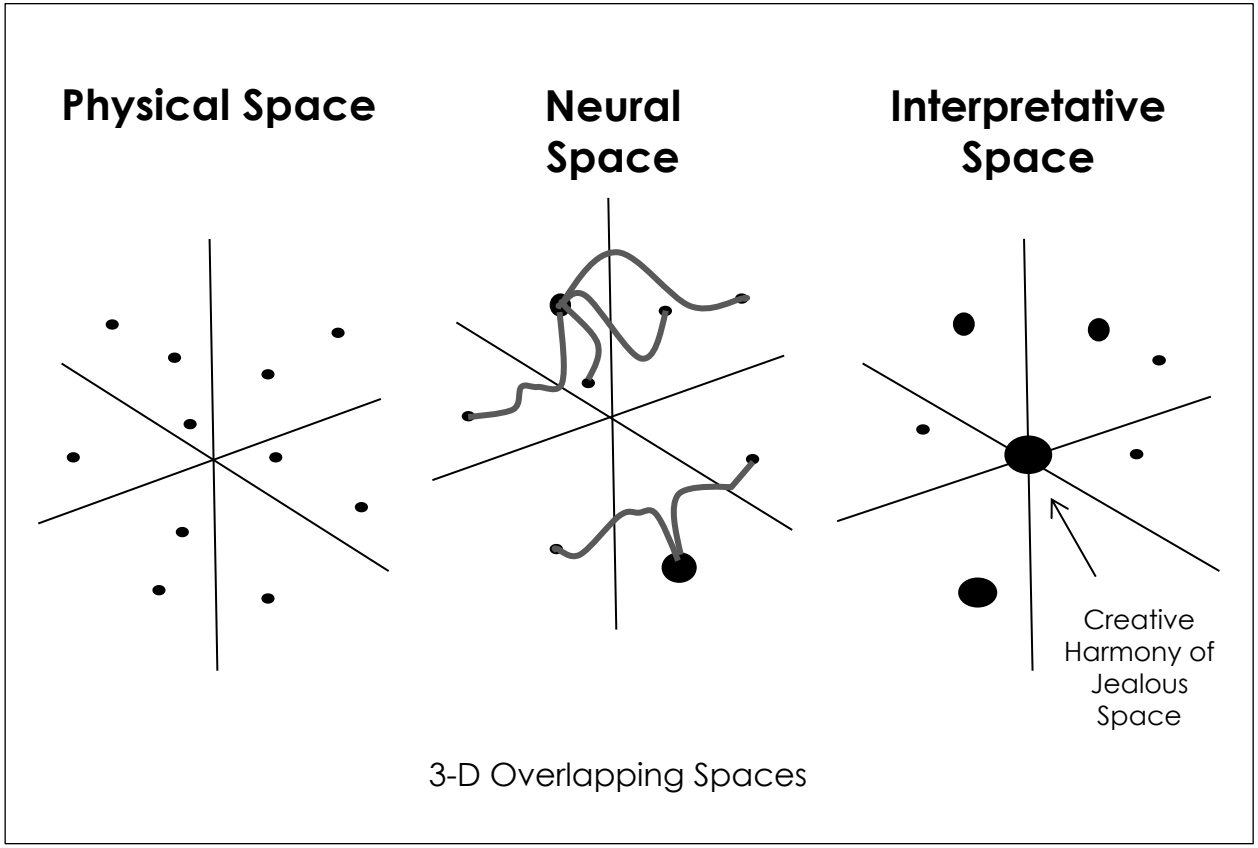
Within a mathematical construct of infinities, embedded infinities are particularly applicable for modeling fully overlapping and partially overlapping 3-D spaces.

Densities of infinities and connectivity of embedded infinities become a means of comparison between the infinite possibilities of a spherical mapping without the enigma of adding, subtracting, etc. the non-number but perceived bounded or unbounded infinites ∞.

Mirroring across Spaces

Within a mathematical construct of infinities, the embedded infinities of the ethical DNA model enacted with **interpretative space** (i.e. the mind) substantially mirrors the embedded infinities of a model of **physical space** (with emergent time, matter and energy) that accounts for the brain—**neural space**.

This mirroring shows a utility of modeling employing embedded infinities of overlapping spaces.



3-D Overlapping Spaces

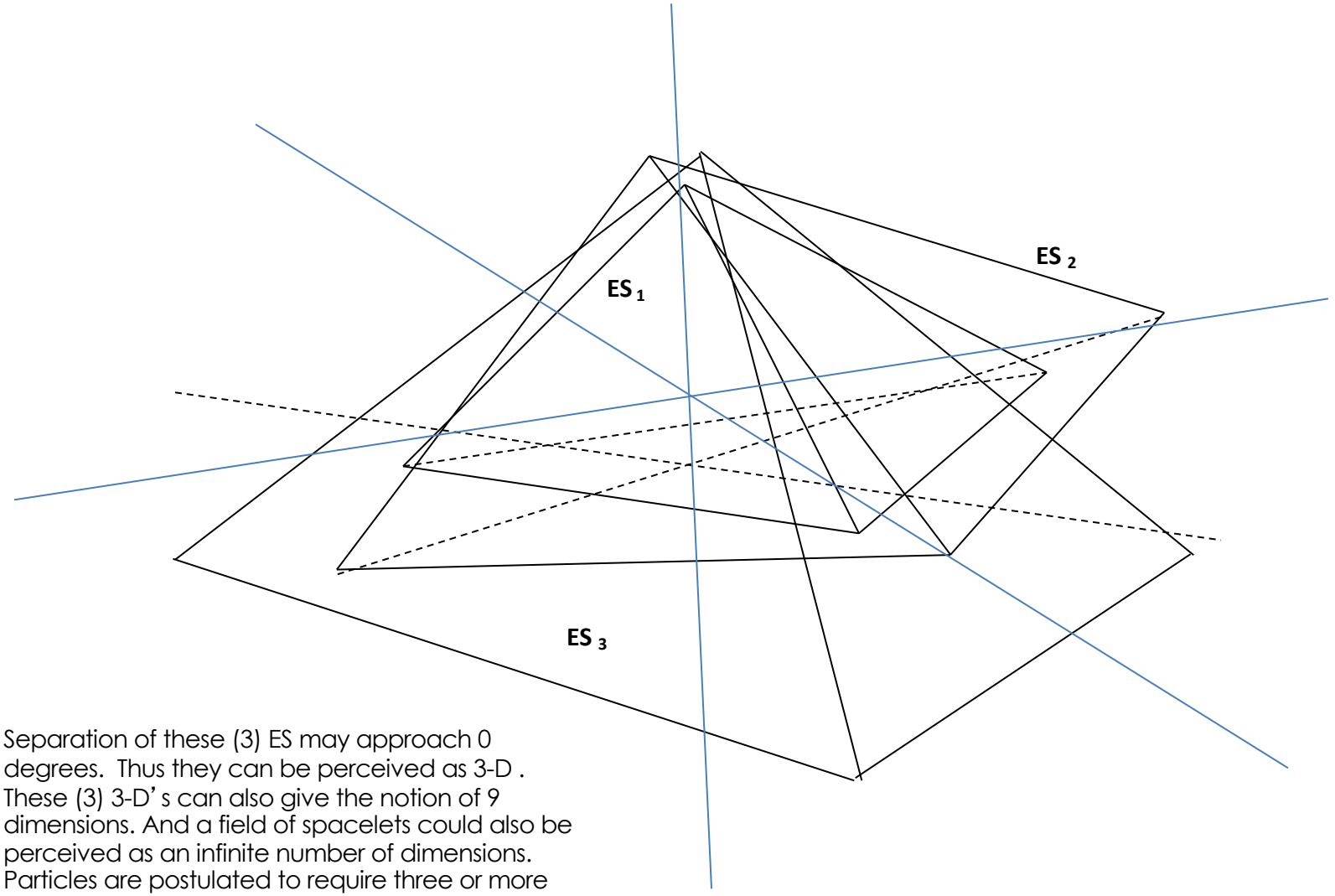
Also see "Model of the Mind from an Embedded Infinities Perspective"

3.3 – Physical Space (spacelets)*

- **ESSENCE: Discrete infinities with Continuous Appearance**
  - Knots as mass with frequencies within space
- **ELEMENTS: Similar infinities**
  - Similar type of elements – spacelets
- **BOUNDARIES: Bounded-Open infinities**
  - Bounded space – originated
  - Open space – unfolding with emergent time
- **FULLNESS: Partially populated infinities**
  - Partially populated infinity by spacelets with emergent matter, energy and time
- **EMBEDDEDNESS: Completely and partially embedded infinities**
  - Three overlapping spacelets as a minimal for sub-atomic particle (knot)
  - Completely embedded for entanglement of particles at a distance
- **INTERACTIONS: Partially patterned, semi-stable, variable strength infinities**
  - Partially yet substantially patterned interactions of same essence of infinities and similar elements
    (Substantially patterned due to possible interactions with alternate realms of reality)
  - Semi-stable knots for emergent matter (particles), equivalent energy and time
    (Emergent time through surface interactions (friction) between discrete spacelets)
  - Mostly semi-stable within universal space and possibly chaotic interactions across universes
  - Variable strength of interactions
- **PERSPECTIVES: Inside, Surface and Objective**
  - Inside perspective for universal space
  - Surface perspective for local space
  - Objective perspective for local space
  - Holographic representation is possible
- **AWARENESS: Active infinities**
  - Active infinity of space

* This is a theoretical model of space, with limited verification. This model is posited in another paper.

Physical Space:
Three Embedded Spacelets



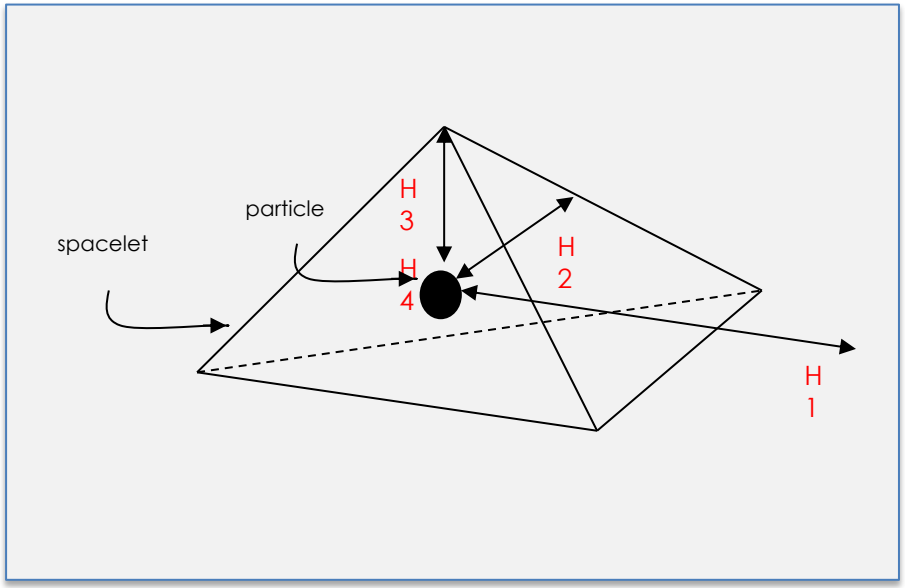
Separation of these (3) ES may approach 0 degrees. Thus they can be perceived as 3-D . These (3) 3-D's can also give the notion of 9 dimensions. And a field of spacelets could also be perceived as an infinite number of dimensions. Particles are postulated to require three or more embedded spacelets to exist.

Physical Space:
Perspectives of a Particle within Spacelet

What if?

A simple particle is a discrete, interactive three embedded sets of three-dimensional spacelets and the lines of spacelets are semi-flexible, not rigid.

If so, then can the perspectives generated from a tetrahedron provide a rationale for various current explanations of space?



Note: Though all lines appear as straight/rigid in the above diagram, they are conceptualized as 'flexible folds'.

Three Perspectives

Classical Space (CS)

H1 (looking inward or outward along a 'flat panel' plane:
– with the apparent absence of extended layers of spacelets

Quantum Space (QS)

H2 (looking inward or outward along a line/fold):
– the appearance of particle-wave uncertainty

Embedded Spacelets (ES Outward)

H3 (looking outward through an intersecting fold point):
– the apparent universality of particle space and expansion of universal space(i.e. any one particle appears to eclipses the entire universe – a uni-dot and the possibility of universes beyond)

Embedded Spacelets (ES Inward)

H4 (looking inward though an intersecting fold point):
– the apparent collapse of universal space (I.e. the entire universe is reduced to a dot)

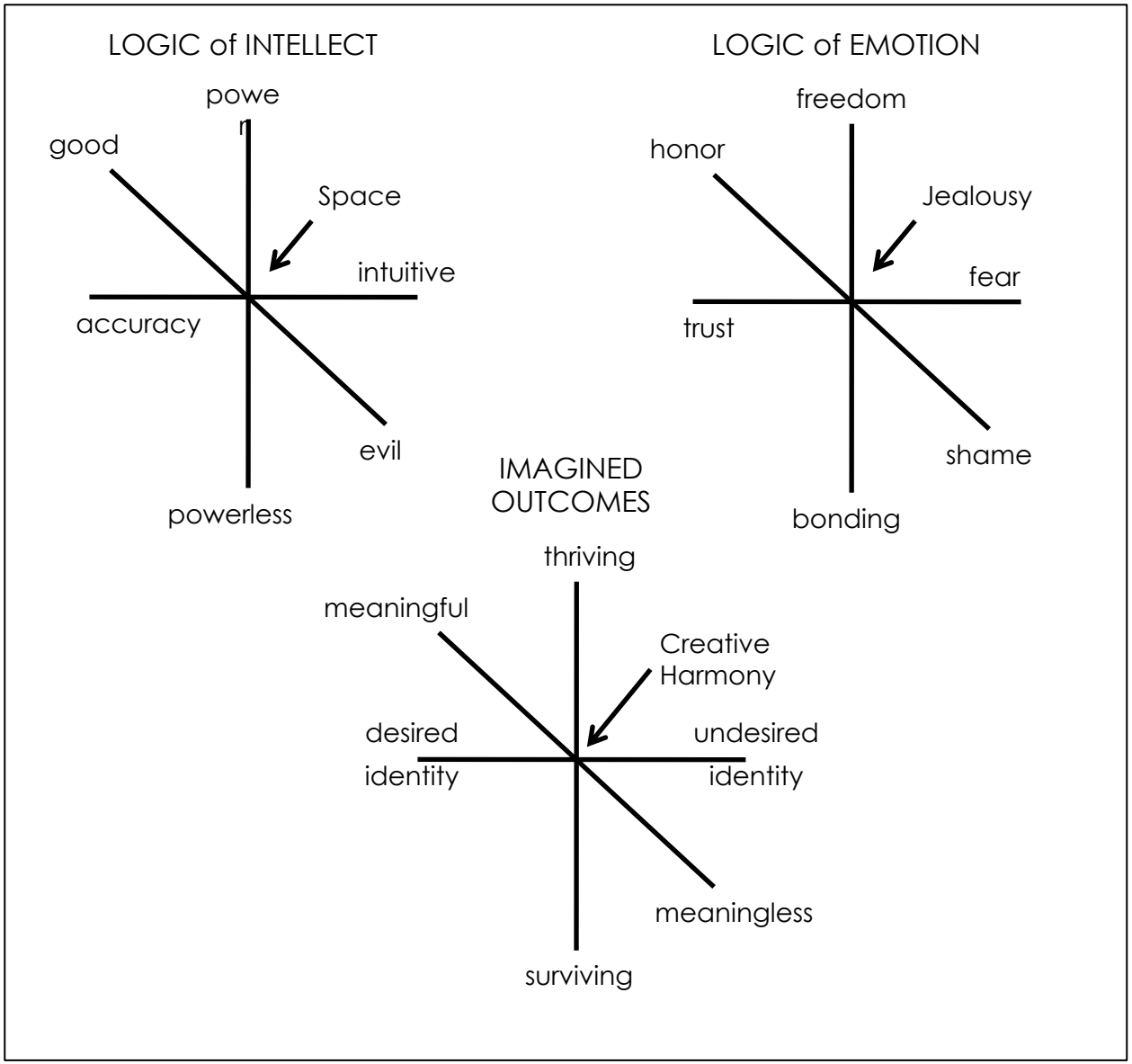
3.4 – Interpretative Space

for Ethical DNA Model * (eDNA)

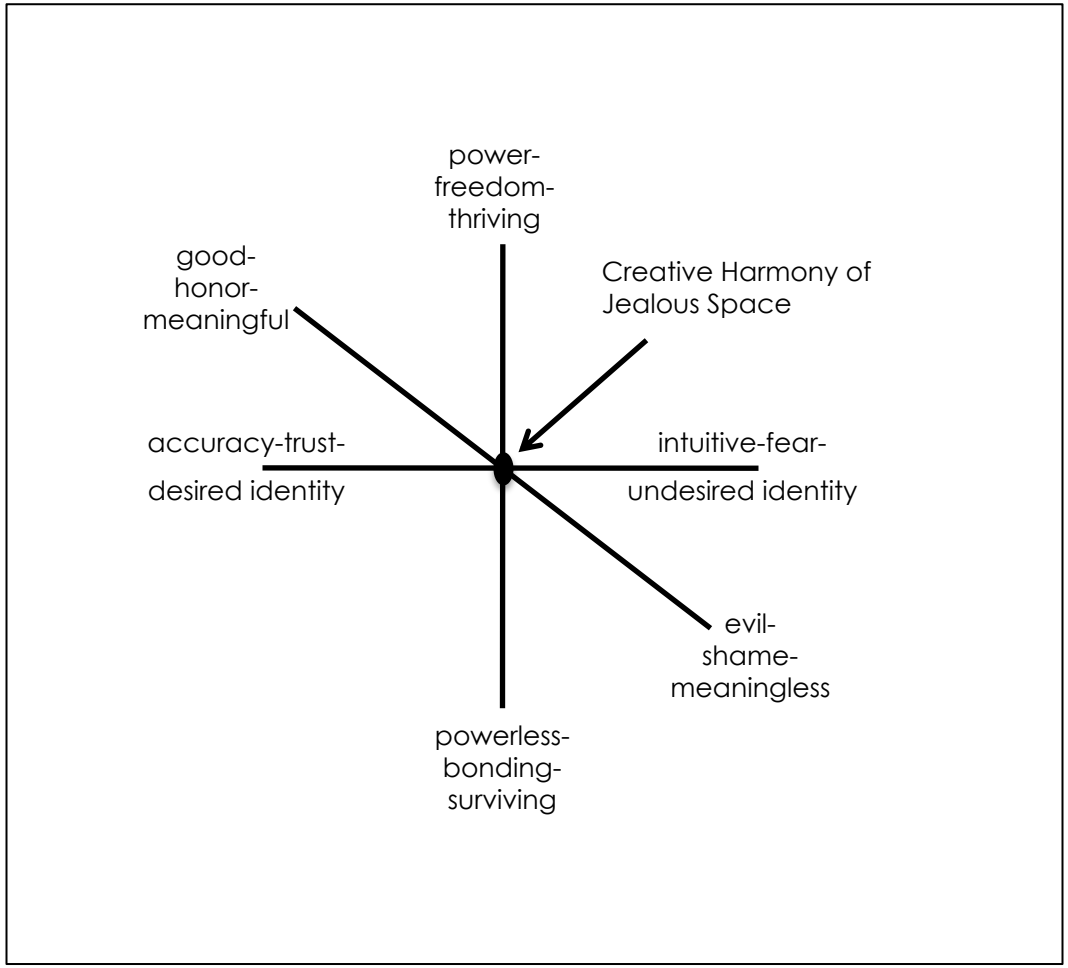
- **ESSENCE: Discrete infinities with Continuous Appearance**
  - Weighted constructed points (i.e. knots)with frequencies within (3) 3-D space
- **ELEMENTS: Similar Infinities**
  - Similar type of elements
- **BOUNDARIES: Bounded-Open infinities**
  - Arbitrarily bounded for utility of software
  - Interpretative grid is a theoretically open infinity
- **FULLNESS: Partially populated infinities**
  - Words and images populated the infinities of (3) 3-D space
- **EMBEDDEDNESS: Completely embedded infinities**
  - Three overlapping axes
- **INTERACTIONS: Partially patterned, semi-stable, variable strength infinities**
  - Substantially patterned interactions of same essence of infinities and similar elements
  - Variable strength of interactions
  - Semi-stable interactions
- **PERSPECTIVES: Inside, Surface and Objective**
  - Inside perspective for mapped locations words and images
  - Surface perspective of word and image connections and adjustments
  - Objective perspective of mapping space
  - Holographic representation is possible
- **AWARENESS: Active Infinities**
  - Active awareness of (3) embedded infinities
  - Accounts for passive and transcendent infinities (through imagination)

- This model assumes that the highest level (limitation) of abstraction the human mind can imagine involves infinite iterations of embedded infinities.
- The model is posited in other papers.

Interpretative Space:
Overlapping (3) 3-D Axes of eDNA

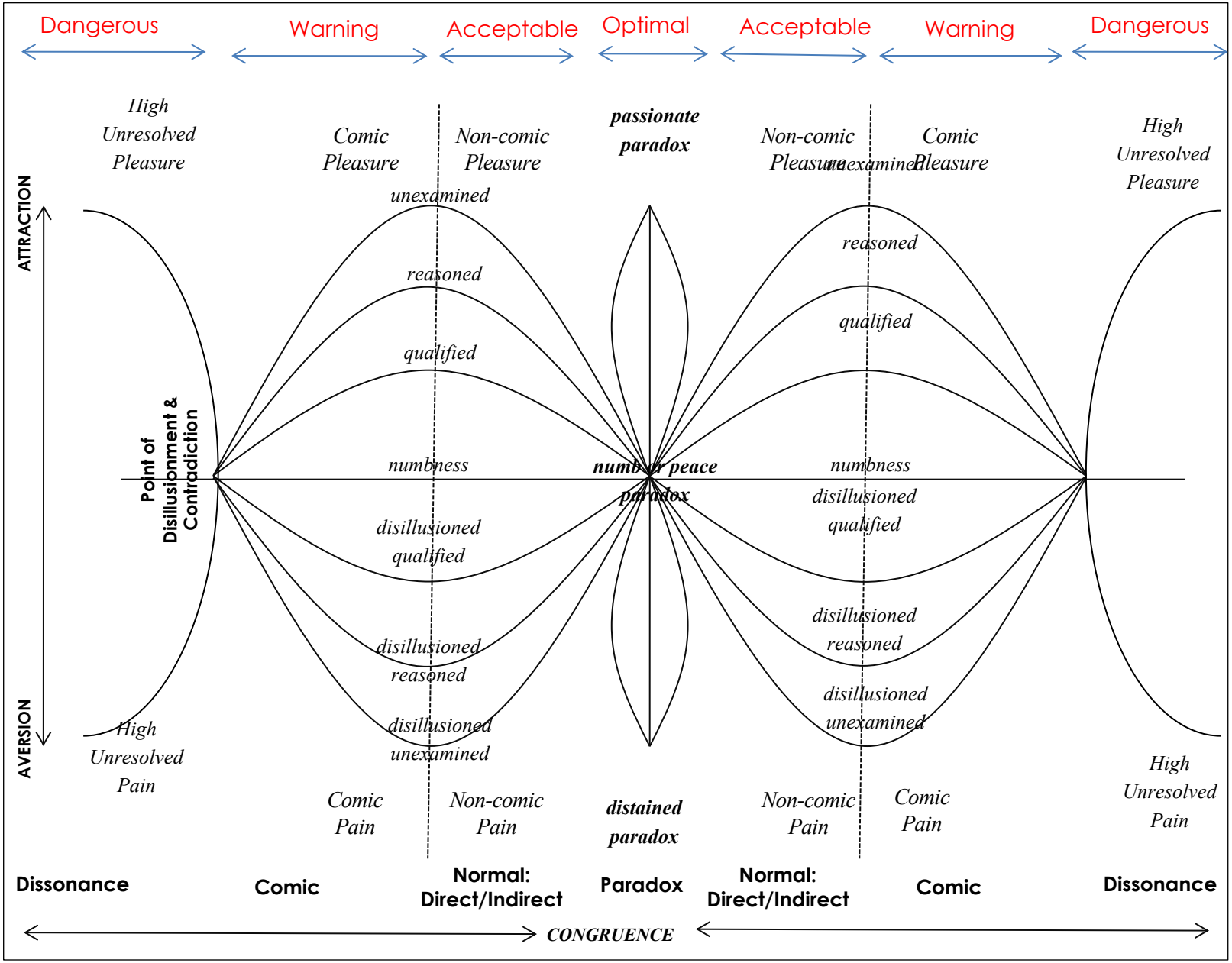


Interpretative Space:
Overlapping (3) 3-D Axes of eDNA Model



Interpretative Space:

2-D Ethical Interpretive Map



Interpretative Space:
Clusters in Network and eDNA

- Each word map for eDNA becomes a cluster with a broader network
  (on a bounded integer scale with a finite number of elements)

- Each eDNA cluster represents 3 overlapping infinities
  (on a bounded real number scale with an infinite number of elements)

3.5 – Symbolic Reasoning: Analogies of Embedded Infinities

MATHEMATICS
Infinities and Embedded infinities

TRANSCENDENCE
Infinities … 'beyondness'
Many religious perspectives

TRIUNE GOD
Unbounded (open) embedded infinities
– analogous to the Trinity

HUMANITY
Bounded infinities embedded in unbounded embedded infinities
– analogous to human in the image of God
– analogous to Christ in us and us in Christ
Bounded infinities embedded within bounded embedded infinities
– analogous to biological successive generations

CONSCIOUSNESS (mind embedded in brain)
Infinite iterations of embedded infinites as the highest level of abstraction imaginable by human minds

UNIVERSE (energy-matter-time derived from embedded space)
Overlapping discrete spacelets in an expanding embedded universe
Sequential, relative time embedded within eternity

HEAVEN (beyondness)
Overlapping discrete spacelets
– varying frequencies for overlapping universes

ralphennis@gmail.com