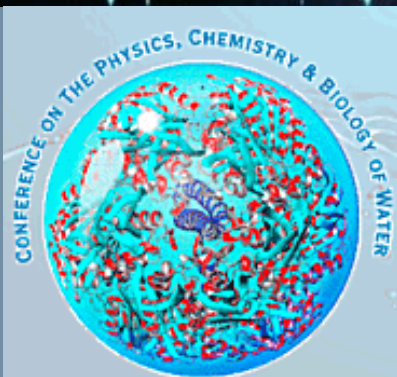# POLITECNICO
MILANO 1863

**The Twelfth Annual Conference on
the Physics, Chemistry and Biology of Water**
Sofia, Bulgaria, October 26 – 29, 2017

Water and SWEME Interactions:
An Understanding Proposal

Rodolfo A. Fiorini

Presentation Outline

1. Introduction (03)

- SWEME Interactions
- Arbitrary Multiscale (AMS) System Modeling

2. Complex System Modeling (03)

- The IDB Problem in Science
- Information Modeling Incompleteness

3. CICT EPG-IPG Fundamental Relationship (07)

- New Vision on Rational Number System
- CICT EPG-IPG Fundamental Relationship

4. Conclusion (03)

- Main CICT OECS Properties
- Half-Plain vs. OECS Space

Water and SWEME Interactions:
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Under the influence of super weak electromagnetic emission (**SWEME**) the water changes its physical properties and becomes able to have the same effect on biological object as well as the substance which SWEME was used.

Its fundamental and peculiar properties have been studied and presented by **Gerald H. Pollack** in the last decades. Nevertheless, up today, there is no understanding of mechanisms of these phenomena, and there are no theoretical basics for the observed results.
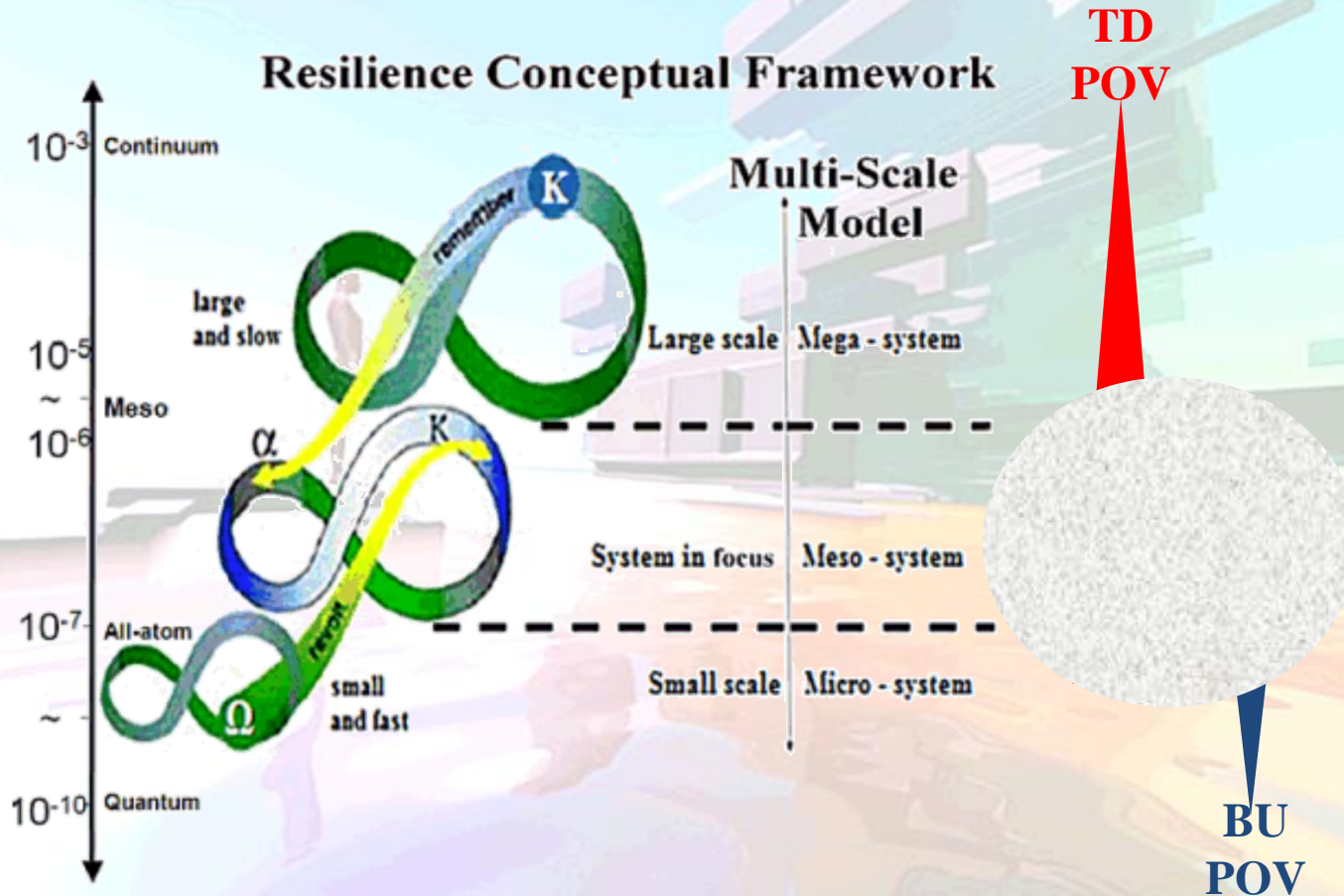
We show a pre-spatial geometro-arithmetic scheme defining **CICT** outer or extrinsic phased generator (**EPG**) and related inner or intrinsic phased generators (**IPG**) to minimize the traditional **arbitrary multiscale (AMS)** statistic modeling veil opacity.

The **CICT EPG-IPG** fundamental relationship can help modeling and explaining peculiar water subharmonic resonant behavior.
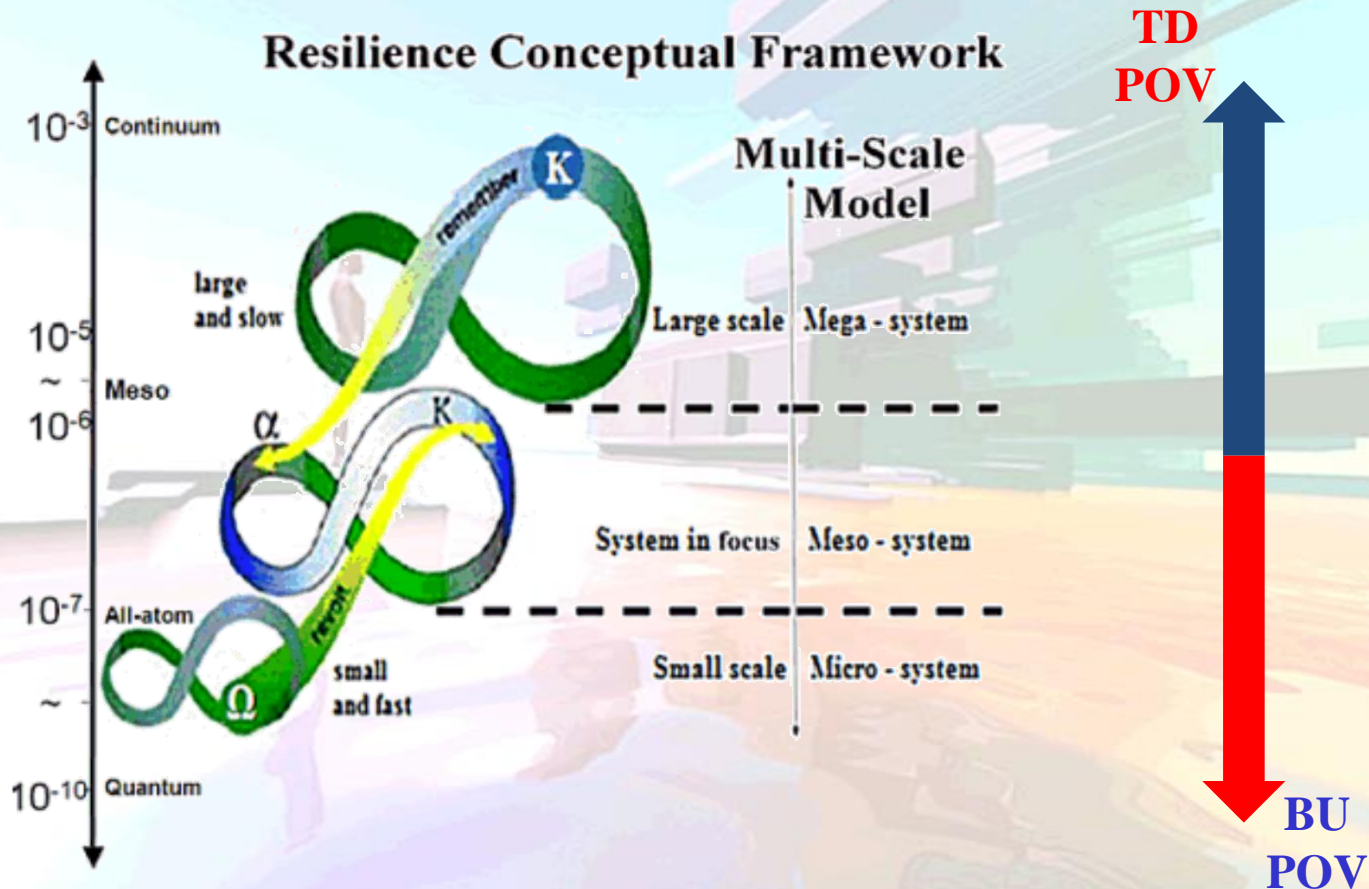
(R.A. Fiorini, 2016)

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The Root of the Current Problem for AMS System Modeling

Resilience Conceptual Framework

Multi-Scale Model

TD POV

BU POV

CICT Solution to the Problem for AMS System Modeling

Resilience Conceptual Framework

Multi-Scale Model

TD POV

BU POV

Current Number Theory and modern Numeric Analysis still use LTR (Left-To-Right) mono-directional interpretation only for numeric group generator and relations, so information entropy generation cannot be avoided in current computational algorithm and application.

Furthermore, traditional digital computational resources are unable to capture and to manage not only the full information content of a single Real Number R, but even Rational Number Q is managed by information dissipation (e.g. finite precision machine, truncating, rounding, etc.).

So, paradoxically if you don't know the code used to communicate a message **you can't tell the difference between an information-rich message and a random jumble of letters.**

This is **the information double-bind (IDB) problem** in contemporary classic information theory and **in current Science** (**nobody likes to talk about it**).

(R.A. Fiorini, 2013)

Water and SWEME Interactions:
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IDB Problem Example
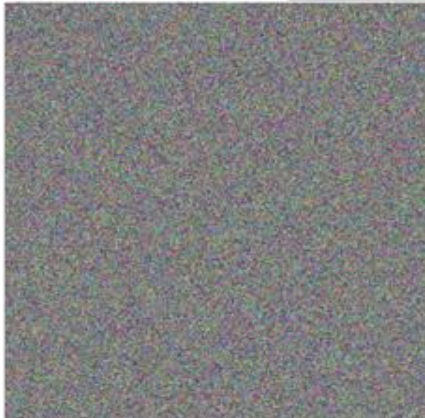## (4,096 by 4,096 pixel, 16,777,216 true color image)

$H_1(X) = 0.999292$ (single precision arithmetic)

$H_2(X) = 0.999292377044885$ (double precision arithmetic)

$H_3(X) = 0.9992923770448853118692398478371254320637916484441241727700678337$

(64-digit precision arithmetic).

$H_1(X) = 1.000000$ (single precision arithmetic)

$H_2(X) = 0.99999999993863$ (double precision arithmetic)

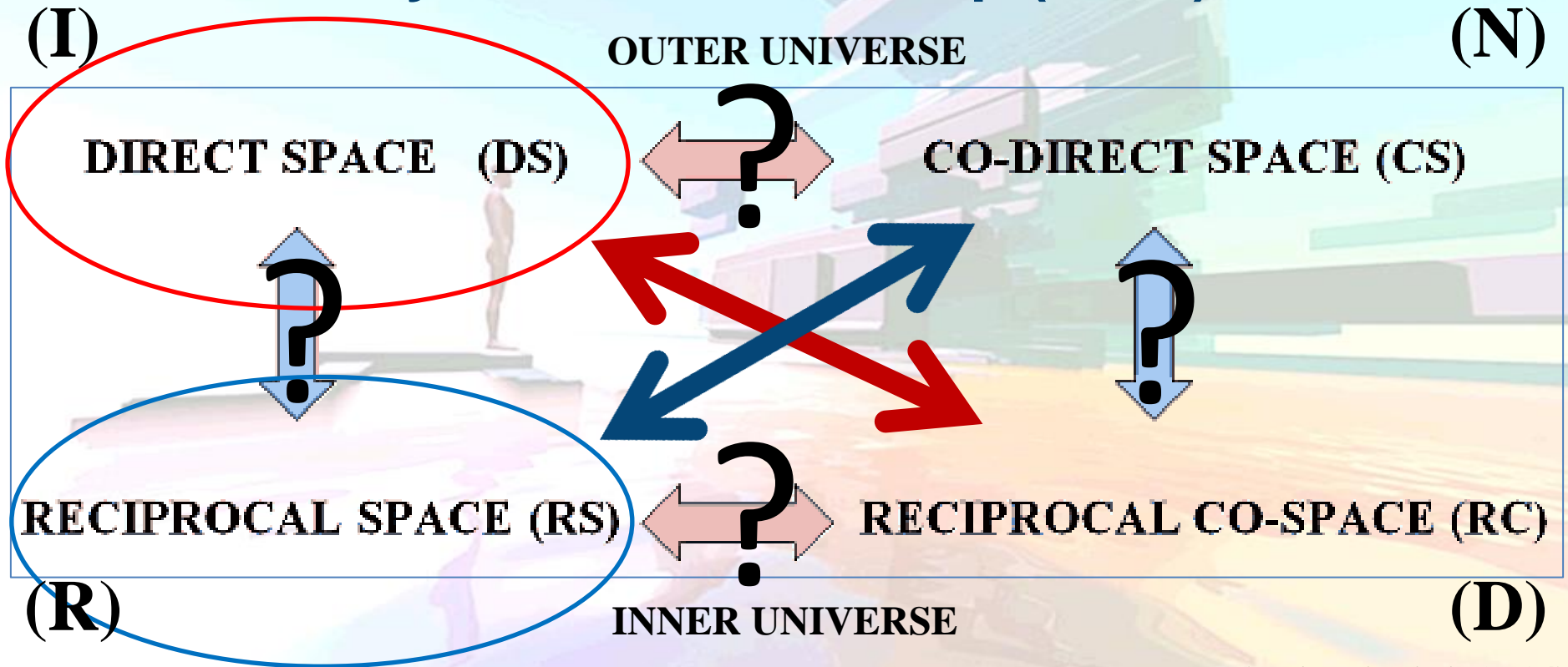$H_3(X) = 0.9999999999386299832757821470665551348090603855394427152819771884$

(64-digit precision arithmetic).

(R.A. Fiorini, 2014)

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INNER vs. OUTER UNIVERSE (IOU) Mapping
By KLEIN Four-Group (CICT)

(I)

(N)

OUTER UNIVERSE

DIRECT SPACE   (DS)

CO-DIRECT SPACE (CS)

RECIPROCAL SPACE (RS)

RECIPROCAL CO-SPACE (RC)

(R)

(D)

INNER UNIVERSE

(R.A. Fiorini, 2014)

Rodolfo A. Fiorini

New Vision on *Q* Rational Number System

Elementary Arithmetic long **Division** minority components (**Remainders**, R), for long time, **concealed relational knowledge** to their dominant result (**Quotient**, Q), not only can always allow **quotient regeneration** from their remainder information **to any arbitrary precision**, but even to achieve **information conservation** and **coding minimization,** by combinatorial **OECS** (Optimized Exponential Cyclic Sequences), for dynamical systems.

Then traditional *Q* **Arithmetic** can be even regarded as a highly sophisticated **open logic**, **powerful and flexible LTR and RTL formal numeric language of languages**, with self-defining consistent word and rule, **starting from elementary generator and relation**.

This **new awareness** can guide the development of successful more convenient algorithm, application and powerful computational system.

(Fiorini & Laguteta, 2013)

The **CICT fundamental relationship** that ties together numeric body information of divergent and convergent monotonic power series in any base (in this case decimal, with no loss of generality), with **D ending by digit 9**, is given by the following CICT fundamental LTR-RTL correspondence equation:

$$\frac{1}{D} = \sum_{k=0}^{\infty} \frac{1}{10^W} \left(\frac{\overline{D}}{10^W} \right)^k \Rightarrow ... \Leftarrow Div\left(\frac{1}{D}\right) = \sum_{k=0}^{\infty} (D+1)^k \qquad \text{Eq.(1)}$$

where $\overline{D}$ is the additive 10^W complement of D, i.e. $\overline{D} = (10^W - D)$, W is the word representation precision length of the denominator D and "Div" means "Divergence of".

Further generalizations related to **D ending by digit 1 or 3 or 7 are straightforward**. Increasing the level of representation accuracy, the total number of allowed convergent paths to $1/D$, as allowed conservative paths, increases accordingly and can be counted exactly, till maximum machine word length and beyond: like **discrete quantum paths denser and denser to one another, towards a never ending "blending quantum continuum,"** by a TD system perspective. **(Fiorini & Laguteta, 2013)**

Solid Number (SN$_x$)

Prime
vs.
Primitive Number
Solid Number (SN$_x$)

Solid Number $SN_1 = 7$

According to our SCO approach, the correct coherent relation representation of traditional scalar modulus $D = 7$, as denominator of Egyptian fraction, is given by:

$$CQ_1 = \frac{1}{CD_1} \equiv \frac{1}{<\infty|(<\infty|0><1|7>)>} \equiv 0.|< \infty|RFD(7) >\equiv 0. < \infty|142857 >$$

To conserve the full information content of rational correspondence at higher level, we realize that **we have to take into account not only the usual modulus information, but even the related periodic precision length information $W = 6$** (numeric period or external phase representation) in this case (i.e. $CD_1 = 000007$ as base RFD).

RFD R_L LTR-RTL
Inner Linear Coordinate Reference (OILCR) for SN 7

←	5	4	3	2	1	0	5	4	3	2	1	0	RTL
LTR	1	2	3	4	5	6	1	2	3	4	5	6	→
Q_L	1	4	2	8	5	7	1	4	2	8	5	7	
R_L	3	2	6	4	5	1	3	2	6	4	5	1	
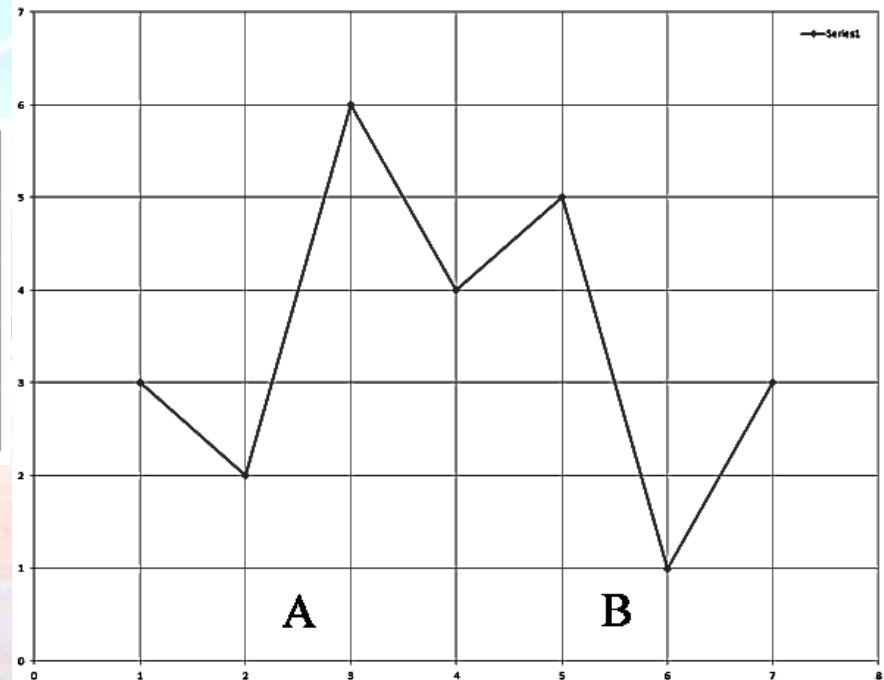
(R.A. Fiorini, 2013)

Primitive Root of Unity for Solid Number $SN_1 = 7$

We can use Euler's identity to establish **the usual fundamental relationship between trigonometric functions and the subalgebra of complex numbers of the geometric algebra $\mathcal{Cl}_2$** in the following way:

$$\exp(\alpha\, e_{12}) = \cos\alpha + e_{12}\sin\alpha \qquad \text{Eq.(2)}$$

where e_{12} is the imaginary unit, usually noted as $i = \sqrt{-1}$.

The final result is:

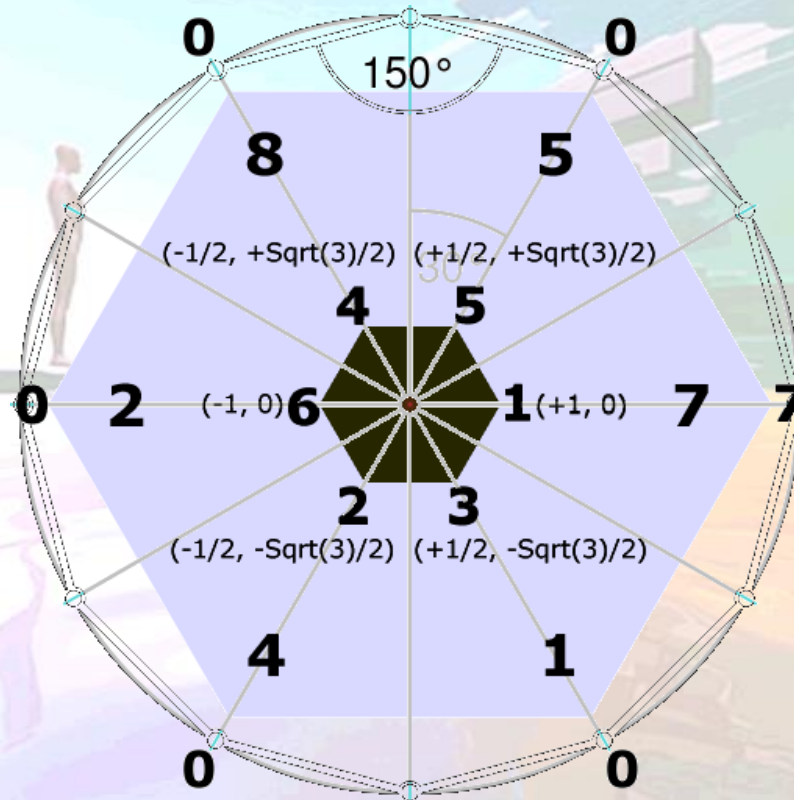$$CQQ_1 = \frac{1}{CDD_1} = \frac{1}{7}\exp\left(-\frac{\pi(1+2n)}{3}e_{12}\right) \qquad \text{Eq.(3)}$$

and

$$CDD_1 = \frac{1}{CQQ_1} = 7\exp\left(\frac{\pi(1+2n)}{3}e_{12}\right) = 7\left(\frac{1}{2}+\frac{\sqrt{3}}{2}e_{12}\right)_{(p.v.)} \qquad \text{Eq.(4)}$$

for $n = 1, 2, 3, \dots$ in N, where (p.v.) means "principal value".

CICT EPG-IPG
Fundamental Relationship for $SN_1 = 7$

(R.A. Fiorini, 2013)

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Main CICT OECS Properties

We got rich new knowledge about fundamental arithmetic number concept and properties by **Optimized Exponential Cyclic Sequences** (OECS):

a) Symbolic vs. **OpeRational** Number Representation;
b) Prime vs. **SN Family Group Order** properties;
c) Arbitrary Precision **Exact Rational Number Representation**;
d) Incidence vs. **Correspondence** in **OECS Word Space**;
e) OECS phased generators **Fixed Point** vs. **Pairing** properties;
f) etc… etc…

More specifically, **OECS Family Group of any order** can play a fundamental role by capturing and optimally encoding deterministic information to be lossless recovered at any arbitrary precision.

Combinatorially **OECS** are totally indistinguishable from computer generated pseudo-random sequences or traditional "system noise" to an external Observer.

Half-Plane Space vs. OECS Space
Two Irreducible Complementary Operative Spaces

Half-Plane Space	OECS Space
❑ Inert matter best operational representation compromise.	❑ Livig matter best representation operational compromise.
❑ A Representation Space endowed with full Flexibility (mapping complexity to simplicity to give space to Imagination).	❑ An Outer Representation Space one-to-one linked to its Inner Representation Space.
❑ Simplified system dynamics framework (Newtonian Approach).	❑ Natural system dynamics framework (Quantum Field Theory Approach).
❑ To model any geometrical space and monitor system dynamics behavior only.	❑ To model projective relativistic geometry and to anticipate emergent system dynamics.
❑ A Spectator can become a system innatural perturbation.	❑ An Observer can become a system natural co-artifex.

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In Memory of My Delocalized Friend Emilio

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