

WORK IN PROGRESS

Threshold Mathematics

V10.8

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Plus further brief notes for future work,
including Dynamic Diagram Language, D2D, Quality (Subjective) Mathematics, Time...

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I. **Threshold Mathematics**

Threshold Mathematics,

as presented here, is a small start towards a mathematics of the *Threshold*, the dynamic interface between the pre-physical and the physical-material realms of being. This *Threshold* can be compared, to the transitional threshold levels in the physical-material world at which gaseous vapour becomes liquid water or at which liquid water becomes solid ice. It's a psychological approach which views the whole discipline of mathematics and its practitioners within their greater cosmic context, and thus as a sub-culture existing within wider social cultures. This means that issues within current mathematics can be approached from beyond its boundaries.

Threshold Mathematics is not an alternative system in opposition to current orthodox mathematics.

It is the basis of an emerging symbolic/diagrammatic language, working to bring increasing coherence to our human understanding of the dynamics of conscious being or existence.

Thus it deals with a dynamic dimensionality beyond physical space and time, and beyond the extremely useful but limited world of Euclidean mathematics.

It's also not a purely abstract discipline, detached from the reality of the physical world, and is not trapped, inertia-bound, in a number system inadequate for handling that greater reality.

So, *Threshold Mathematics* is, in essence, the mathematics of conscious being, leading to an understanding of:

- how the cosmos and *individual I* came into existence,
- how *individual I* relate to the cosmos, at both the pre-physical and physical-material levels,
- how *individual I* relate to other entities within the cosmos.

This involves developing a sense of engagement and participation in the evolving cosmos.

It also transcends the familiar Western distinction between *subjective* and *objective*, which implies a profound expansion and progression beyond the conventional notion that pure mathematics is necessarily objective and abstract.

"*Mathematics is the language with which God has written the universe*"

is an alleged quote from Galileo, an early pioneer of Western materialistic science.

Others have made similar claims that mathematics is the language of nature and so on. These can be interpreted as ways of asserting that there is a coherent order to be found behind the apparent superficial randomness and disorder of the everyday world in which humans live their lives.

But given that physical-materialistic science and its associated mathematics have proved sterile in helping humanity comprehend the rich, multi-level subtleties of conscious life, could another kind of mathematics serve as a more appropriate language for this purpose?

Threshold Mathematics offers an inclusive and comprehensive approach to understanding the basics of cosmic order and functioning, beyond *objective* and *subjective*. It opens up a simple, coded, diagrammatic way of understanding and describing the dynamics of being a human individual within our greater cosmic context.

Each individual being is understood to be a unit of consciousness, a radiating focal point, and an integral part of a greater inclusive presence of conscious being, called in this work *universal consciousness, UC*, (a non-religious concept).

Threshold Mathematics deals with the *pre-physical* realm beyond the scope of physical physics, and brings a coherent rationality to the supposedly counter-intuitive *quantum* world. It's based on three axiomatic principles governing how the cosmos and all that it comprises function.

These are outlined in *The Becoming* chapter in **Notes from the Threshold**, which is the core section of a longer work entitled *The Threshold Perspective*.

Threshold Mathematics, meanwhile, has resolved certain key mathematical 'problems' which for centuries had remained unresolvable to mathematicians working within the limitations of conventional mathematics and especially the number system.

For example, revealed is the rationality of the so-called *irrational numbers*, and also the previously undiscovered order governing the sequence of the *prime numbers*, first published online in 2006 (*The Primal Code*).

This approach also provides a conceptual framework, ie a greater context, for re-interpreting work already done in the name of science and mathematics.

Eg *universal consciousness* is the 'negative' realm of *no-thing-ness*, an inclusive 'big zero', while the *cosmos* (which means 'order') is the primal *one-ness*, and all subsidiary centres of *individual consciousness* are focal points of and within the original universal consciousness.

This part of a broader **Threshold** work focuses on a few key enigmatic features of mathematics.

They include *zero*, *one*, *pi*, the *Golden Ratio*, the *Fibonacci Series*, *imaginary numbers*, the *prime numbers* sequence, the *Riemann Hypothesis*, the *Goldbach Conjecture* and *Fermat's Last Conjecture* (in the absence of a proof). In so doing, it reveals a coherent pattern in the cosmos, an overall order within which numbers labelled as '*irrational*' are found to perform an essential, rational function.

For example, once it's realised that the apparent irrationality of the *prime numbers* sequence results from the artificial merging of two simple sequences based on one consistent *rationale*, the obvious key question arises: *What significant principle in the greater reality do these two sequences represent?*

And once it's clear what the prime numbers do signify, it follows that *Riemann's* intuitively sensed hypothesis, unproven since 1859, is essentially sound, although mathematically invalid and unprovable.

First: Overview + Insight

One way to resolve any apparently insoluble problem is first to bring to the whole situation an awareness of its inherent **polarity**. This involves gaining:

- (1) an **overview** in order to see the system as a whole within its greater context, as well as how it has evolved into its present state, and
- (2) some **insight** to penetrate to the effective centre, the heart or core of the situation.

Combining these two perspectives reveals the primary dynamics of the system and thus its essential *meaning*, ie what it's *meant* to be and do.

In this mathematical work, fundamental questions of human identity, origins and destiny – in the individual, collective and universal sense – are not directly addressed. They are, however, implicitly acknowledged as essential in comprehending the broader psychological *context* of mathematics.

An unwholistic alliance: mathematics and science

Mathematics is widely understood as the quest to discover ever clearer, more accurate and consistent patterns within this fragmented universe, to find *order* within apparent randomness. However, the concept of *randomness* can be seen as a convenient label, used to cover up an inability to handle certain degrees of complexity in how a few simple cosmic principles work out.

As a code or language, mathematics consists of various ways of ordering and quantifying information about whatever it attempts to describe. It is, essentially, a *mental* discipline which means it has the potential for endless *abstraction*. As such, mathematics works with abstract concepts, ideas abstracted from physical reality. For example, 3 apples are 'equal' to 3 kangaroos or 3 years, but only 'equal' in the abstract sense of their common *three-ness*.

Physical-material Science, meanwhile, studies the messy physical-material world which is subject to a continuously changing configuration of cosmic and internal influences. So in attempting to accurately repeat experimental situations for comparison, physical scientists can only ever achieve approximations. So they employ mathematics which creates a seductive but artificial impression of precision, consistency and authenticity.

And mathematics, as will be shown, uses a number system which mimics material systems of identically manufactured objects such as coins or bricks. Thus has arisen an unwholistic alliance of mutual compensation for each others' inherent weaknesses.

Among the better known special features of this mathematical order are its so-called 'irrational' numbers, values such as those represented by the symbols **π** , **ϕ** (*the Golden Ratio*), **i** (imaginary numbers), **e** (the constant of growth) and sequences of numbers such as the *Fibonacci series* and the *prime numbers*. The label *irrational* is used for numbers that don't fit into the orthodox *rationale*.

Among the most fundamental unresolved questions are: 'What is actually meant by the symbols for zero, one, and the so-called *negative, irrational and imaginary numbers*?

And these questions inevitably lead to fundamental issues such as: Which is primary: Consciousness or matter? Subjective or objective? Quality or quantity?

Mathematics in context

The *Threshold* approach, effectively, views current mathematics from 'outside the box', from a dimension beyond the fortress/box of mathematics. It embraces the continuity, polarity and movement of the reality behind all the frozen fragmentation, and so reveals pattern and coherence not apparent from within that box.

So, next follows a *scenario* intended to serve as a *context* within which mathematics can be seen as a particular, specialised language, a code – not a science. The validity of the *Threshold* perspective will be tested through checking whether it helps in finding otherwise undetected patterns of order in the cosmos and in resolving otherwise unresolved mathematical problems. For present purposes the scenario is much simplified.

2. The Becoming

Being at the Threshold

To optimise the power of *overview* and *insight* requires being consciously present at the critical *Threshold* where the primal polaric forces of the cosmos, **gravity** (contraction) and **levity** (expansion) are in a state of dynamic balance. That is, at the border, the interface of the gross *physical-material* realm of *density* and the subtle, pre-physical realm of *rarity*, known for centuries as the *aether*.

This *Aether* has nothing to do with the 19th century, materialistic, so-called *luminiferous ether*, the existence of which was supposedly but falsely disproved by the Michelson-Morley experiments. More recently, the speculative notions of *dark energy*, a *zero point field*, *morphogenetic fields*, the *quantum vacuum* and physicist Professor Paul Davies' *quantum ether* all seem to be pointing to the need to re-acknowledge the ever-present, all-pervading *Aether*.

This quotation is from the 2006 book ***Aether - The Transcript*** ISBN 1-900034-10-7 and its original audio CD-ROM ***Aether - Knowledge is Power***. These publications explain why the *aether* was written out of the script of Western science but has never actually gone away. Meanwhile, in the view of UK professor of mathematics, Martin Huxley, most mathematicians are Platonists, and in Plato's time – before the era of materialistic science – the *aether* was considered very much a living reality.

This *Threshold* is not a definable location in space, but does have the vital, turbulent, energetic and transforming characteristics of what has been called the *zero point field*. It's a kind of *level*, like the critical temperature level at which water is transformed into vapour or ice and back. Its essential *polarity* is acknowledged by Western science, somewhat awkwardly and one-sidedly, in pairs such as *matter/anti-matter* or *gravity/anti-gravity*.

A powerful benefit gained from awareness of this *Threshold* is a simultaneous *two-way perspective* on the world:

- (1) A focussing inwards of consciousness, as if from a universal plane, giving a kind of reverse panoramic, all-inclusive view from all directions at once. This enables one to zoom in and *focus* on any particular point. The *Google Earth* program represents a crude, simplified version of this capacity.
- (2) A radiating outwards of awareness, in all directions from any physically located, uniquely individual, focal point of consciousness.

This fundamental *polarity* of *inward/outward* is of primary significance in this work. The *inward* seeing enables the expanded, 'greater, *universal I*' to view the world of the contracted, 'little, *individual I*' in as wide a context as seems appropriate. A limited analogy would be viewing a whirlwind from the *stillness* both high above and at its centre, the 'eye of the storm' – each qualitatively different and distinct from the turbulence in between.

Mathematics can also be viewed this way. So the *Threshold* also represents a level of consciousness which transcends the limitations of the physical-material mentality, in that it extends beyond the intellectual, quantifying, calculating operations associated with the physical brain.

The enigmatic phrase '*Less is more*' implies a *polarity* – here, less of the gross, physical-material implies *more* of the subtle, 'something else' quality of the pre-physical realm, and vice versa.

Own presence included

Essential to the wholeness of any situation in which a person is involved is his or her own conscious presence. So there is always (a) the observer (subject), (b) the act of observing and (c) that which is observed (object). To ignore any of these three essentials from an investigation would leave an

incomplete, false picture.

This has been a dilemma for materialistic Western science with its requirement for 'objectivity', despite the 'observer effect' acknowledged in quantum physics. However, the paradox can be transcended and resolved by explicitly acknowledging the presence, effects and unavoidable participation of the observer, the *subject*, who is then an *objective* element of the situation.

'The Becoming' (scenario)

Universal consciousness is assumed to be the ultimate essence of the unlimited *void* or *space* of the physical and pre-physical cosmos. To make this axiomatic assumption is not to adopt any kind of religious standpoint. It's a strictly scientific view based on the understanding that without an ongoing *universal* state of consciousness, there would be no awareness shared amongst *individuals* of all the phenomena treated as the content of science.

This 'parts-of-the-wholeness' relationship is somewhat like that of individual lungfuls of air in relation to the whole, shared atmosphere of the Earth. And it was an eminent 20th century physicist, Eugene Wigner, who asserted that '*...the content of the consciousness is an ultimate reality.*'

Next comes the *pre-physical* stage of development, an intermediate level of *potential* physical existence, prior to manifestation. For reasons as yet beyond human understanding, within universal consciousness a specific, singular *focal point* is brought into being, which automatically constitutes a centre around which a pre-physical, pulsating *sphere* is instantly formed. This primal sphere constitutes a pre-physical *resonant cavity*, the potential *cosmos*, in which are generated rhythmic pulsating waves of *contracting* and *expanding* movement.

The dynamic relationship between periphery and centre point indicates a universal tendency towards re-establishing an equilibrium state, while this dynamic, pre-physical potential is, in essence, primal, potential **energy**. And herein lies a significant clue to resolving the *wave-or-particle* dilemma of modern physics: the 'particle' is the centre point and the 'waves' of energy are created by the pulsating of primal energy between periphery and centre.

The vital, continuously changing intermediate state of being thus created functions as a medium, and has long been known in the Western world as the *aether*, and comprises a range of distinct levels. Einstein explicitly asserted that space without the aether is inconceivable, although he chose not to include it in his abstract theory of *Relativity*. It was also integral to Newton's thinking, and appears throughout the history of science under a variety of guises and names, currently for example, *quintessence*, which means the fifth essential element.

Meanwhile, as the pulsating continues, *spherical standing waves* are propagated, which themselves constitute progressively smaller sub-spheres, resonant cavities all within the original one, the cosmos. The result is increasing *density* towards the centre point and *rarity* towards the periphery. The smaller the resonant cavity, the faster the tempo of the rhythm of resonance within it and the higher its tone or 'frequency'.

Rhythm or frequency?

A distinction is drawn here between the *tempo* of a *rhythm* and a fixed *frequency*.

The *tempo* of the *rhythm* in a system implies continuous, subtle variation in the timing of movements due to the ever changing circumstances, cosmic and natural, inner and outer.

Frequency, although more convenient for comparing and calculating, implies a fixed, regular, mechanised sequence of exactly equal periods. This means it's an idealised, abstract, average value concept.

Formation of matter

The increasing density around the centre creates *interference* effects which impede the inward and outward wave movement. Eventually a critical level of obstruction or stasis is reached at which physical *matter* begins to form – gaseous, then liquid, then solid.

The process is a kind of *weaving* between the active, vertical, pulsating waves of *weft* energy and the inert, horizontal, *warp* resistance of the standing waves. This dynamic process occurs at the critical *Threshold* between the two distinct realms, all within the greater cosmic oneness.

Matter, then, is energy amassed into an endless variety of forms which are themselves in a continuous process of disintegration, of being released and redeemed back into the ocean of cosmic potential energy. An earthly parallel would be the *water cycle* between airborne vapour and surface liquid.

In animated suspension

The pre-physical essence of each individual human being is a radiating focal point at the centre of a sphere within universal consciousness, and temporarily clothed in matter, formed around that centre. It's held in suspension at the critical border, the *Threshold* between the two cosmic polar forces – like a bubble representing the interface between *levity*-raised air and *gravity*-laden water.

The more deeply such points of consciousness become embodied in solid, earthly matter, as energy trapped by inertia, the more they tend to conceive of their world in terms of quantities of bits and pieces, particles, building blocks, mechanisms and so on.

This is essentially what is indicated by the notion of the *descent into matter* in the vast process of *cosmic and natural evolution*. As *gravity* prevails over *levity*, movement becomes crystallised, flow becomes static, inert, frozen, solid form, and unity is fragmented into a diversity of separate forms.

So, from the *Threshold* perspective you do not 'see' a mechanical structure of assembled, standardised bits. It's perhaps more like looking at a *stereogram*, a flat 2D image which at first looks like an amorphous mass of dots or small details. Then, if and when you 'get it', there begins to appear before your eyes a recognisable form... and suddenly it's there, a clearly visible 3D image which wasn't apparent before, although nothing in the physical image has changed.

So, the *Threshold* approach doesn't start with numbers and symbols, ie the end products of mental processes. It starts with universal consciousness and the dynamic, fluid, moving energy processes of the cosmos which generate the world of material forms.

D2D Dynamic 2-Dimensionality (see page 36)

This describes the pre-physical level of existence where the *dynamic* between *levity* and *gravity*, and thus between the periphery and centre of the cosmos and of all within it occurs,.

And it's this dynamic, prior to 3D physical space, that generates primal **energy**, which holds the potential for manifestation into kinetic energy and materialisation into physical form.

As a fundamental principle of functioning of the cosmos, *D2D* is axiomatic to *Threshold Mathematics*.

So, grasping the basic simple principle of *D2D*, as a fact of the cosmos, is crucial for venturing beyond:

- (a) the limitations of current number-based mathematics (as indicated by Gödel), and
- (b) the physical-material, gravity-dominated, 3D, 'box-space', grid-like conception of space.

D2D thinking does not require abstract mathematical concepts, disconnected from the reality of the physical-material and pre-physical realms. However, it's not possible to encapsulate in a still 2D image.

Observed from the *Threshold* perspective, those mathematicians who are inclined to float off into abstract, *multi-dimensional* fantasy realms appear to be, in effect, concocting an open-ended series of 'get-arounds' to try to escape the limitations of current EMU mathematics.

Meanwhile, appreciating the fundamental significance of *D2D* is necessary for resolving various longstanding enigmas and paradoxes of orthodox mathematics and science.

A chess analogy

To illustrate the value of the *Threshold* perspective, in enabling one to think 'outside the box', ie beyond the limiting parameters of any particular discipline or closed system, here's a chess analogy. A chess champion's failure to overcome an apparently insignificant challenge could not be explained by the chess experts after lengthy obsessive expert analysis of the moves made on the 'square of squares' chessboard. However, when attention was paid to the state of mind, attitude and body of the champion at the time, in contrast to that of the challenger, the reasons for the unexpected outcome became clear.

Summary: the three basic *Threshold* principles

1. *Consciousness* – universal and individual, the ultimate, conceivable, original essence of who and what we humans and the whole of the cosmos are.

2. *Polarity* – originally the pre-physical, complementary cosmic forces of **levity & gravity** 'within' universal consciousness, creating primal *energy* in *D2D*, then sub-dividing into endless sub-polarities. So, every *polarity* situation occurs within a greater *unity*. This contrasts with the *binary* concept of duality which ignores the greater reality and context that's common to both parts.

3. *Resonance* - consonance (harmony) / dissonance (discord) of relative vibratory rates within this dynamic, pulsating cosmos.

3. EMU Numbers

Equal Measure Unit (EMU) Numbers

Number systems are normally based on the assumption that in all circumstances one specific *unit* represented by a number symbol is exactly equal in value to any other such *unit*, ie they are rigidly standardised. In this work, such numbers are referred to as EMU (*equal measure unit*) numbers. Since humans have been able to reproduce standardised material objects, such as bricks or coins, there seems to have been a strong temptation to look at the world around us as though the cosmos and all in it were made of some kind of minute, identical *building blocks*.

However, this view does not coincide with the continuity, the fluid, pulsating, ever-changing reality of cosmic and natural *expansion/contraction* into *rarity* and *density*. Neither does it coincide with how minds and feelings function. There is a fundamental incompatibility here, for the cosmos is not an assembly of unit measures of cubic *space* or units of '*time-line*' duration. A mesh or grid of squares can be placed around any object or space to enable it to be measured and calculated in terms of squares and cubes, but that only gives a 'map', a model or a diagram of the actual reality.

So the EMU number system, like the *binary* digital bit system, is essentially an ingenious artifice for simulating and modelling reality. It is ultimately a *trick*, a deceptive device, which requires our *suspended disbelief* in order for it to work.

As such, it can be likened to the trick of cinema, where a sequence of still images is 'seen' as movement and life... or the digital equivalents. The Greek word *kinema* means motion. This defining characteristic of current mathematics is the illusion, the shift in perception between the physical actuality and the psychological perceiving, that enables much of mathematics to work. It is, therefore, both its strength and its 'fault-line' weakness.

The EMU system has proved a very useful device when applied within the physical-material realm and within the range of scales to which humans can readily relate. However, the incompatibility becomes increasingly problematical towards the extremes of the human scale of comprehension, in both time and space. Here a growing sense of meaninglessness is experienced in trying to come to terms with extremely large and extremely small numbers. And then, pointing beyond the vanishing extremes of what we can conceive are those signposts labelled *infinity* and *eternity*.

All numbers are bi-polar

Because the aethereal realm is of a qualitatively different order from the physical-material basis of an EMU system, any complementary system would have to incorporate such qualities as the vital, inclusive wholeness, continuity and fluidity of natural growth and transformation... for a start.

Consequently, the *Threshold* perspective reveals each number, and especially *zero*, *one* and *the primes*, as being *bi-polar* in having two aspects:

(A) Their *qualities* of *no-thing-ness*, *one-ness*, *two-ness* etc, seen in the bigger subjective context of a continuous, all-inclusive reality of consciousness, and

(B) Their strictly *quantitative*, objective, exclusive, 'discrete unit/bit' characteristics within the EMU number system,.

One implies two begets three implies four...

So, within the full no-thing-ness of universal consciousness, *one-ness* has the potential of focussing to create *two-ness*, and two-ness within oneness implies *three-ness*. The third factor, as an intermediary, can then itself be 'polarised' between the two original poles until it divides into two, thereby producing *four-ness*... and so on.

The grid filter

Part of the rigid EMU standardising process is what's here called the **grid filter** mentality. It's looking out at the physical world as if through a grid filter, and analysing it in terms of EMU cubes, squares, lengths, weights etc. This can lead to the belief that all forms are assemblies of 'micro building block' particles, discrete *bits*, molecules, atoms etc.

Digital **bitmap** images, composed of mosaic-like squares, are an exaggerated version of this idea – especially when illustrating curves.

Fractals are iterative, artificially identical, ever smaller 'worlds-within-worlds' images which artificially mimic nature, and are computer-generated by a simple mathematical formula.

This kind of mindset seems to arise in cultures which prioritise *measuring* and *quantifying* - as if *quantities* are more real than the primal *qualities* actually experienced first.

The *grid* can then become a mental trap, a prison, imposing rigid restrictions on imagination, inspiration and intuition. It can also 'conveniently' insulate minds from the less precise, less easily controllable, fluid and fiery realm of intuition, instincts and feelings.

So the *grid* way of thinking is very useful, but has harmful effects on the *quality* of life.

The EMU system is now so familiar and useful for measuring, counting, calculating and constructing – ie controlling the physical world – that it has become for some a delusion, a false assumption of how the cosmos functions. So the end product of a process is sometimes treated as though it were the beginning. For example, curved lines may be defined as 'composed' of points – like imaginary building blocks – rather than as a consequence, such as a *trail* following a curved movement.

4. Threshold Numbers (the 'irrational' made rational)

The *binary* flaw

The meaning of *zero*-ness and *one*-ness go right to the heart of all questions about quantity and, therefore, mathematics. The meaning the symbols for **zero** and **one** have evolved is symptomatic of a materialistic culture, ie the context in which current mathematics has developed.

For example, the materialistic version of *zero* signifies an empty space, representing an absence of any specific items, while *one* normally signifies simply a single *unit* of something, as opposed to the unity of one whole entity which may include a number of units.

This demonstrates **binary** thinking which operates in exclusive yes-or-no, black-or-white terms, and fails to acknowledge that there is always a greater wholeness within which the *polar* opposites are included. Binary thinking is the fundamental flaw underlying the instability inherent in *digital* technology, with its sandcastle simulations, always liable to fragment, disintegrate and fail.

Zero: the living void and the infinitesimal

The *Threshold* view of **zero** shows a clear *polarity* linking the paired ideas of **infinity** and the **infinitesimal**. There's an *outward* infinity of ever expanding proportions disappearing into the beyond, and there's its polar opposite, an *inward* infinity, a *vanishing point* of unimaginable smallness, also sometimes known as the *infinitesimal*. These vanishing planes and points can be seen as *portals* on the inward and outward journeys between the pre-physical and the physical-material realms.

The *infinitesimal* seems to imply the idea of both the *wormholes* of the physicists and the rabbit hole through which *Alice* entered her *Wonderland* (in a story written by a mathematics lecturer). It also relates to the ancient Greek concept of the indivisible *atom* and to the *quantum* idea of the smallest quantifiable amount of energy.

The infinitesimals of Newton and Leibnitz

In the 17th century there was a historic dispute between Newton and Leibnitz on this theme which can now be seen as a *polarity* issue. They were both reaching for the *transcendent* level beyond the physical, but from polar opposite directions. Leibnitz, through the *infinitesimal*, emphasised *consciousness* which he expressed in the subjective terms of our irreducible *self* or *monad*. Newton raised the level of thinking from concepts set in physical *space* to the more aethereal dimension of *time*, with his *moments* as units abstracted from a context of continuous *motion* and *flux*.

Had there not been such personal animosity and national rivalry colouring all this, some greater inclusive wisdom might have emerged from a fusion of their insights.

Zero, then, viewed from the *Threshold*, represents what is experienced and recognised as a transitional moment or event. From the physical side, it's inherently paradoxical – the something somewhere between the EMU building blocks or between the boxes in a grid. Yet it has its own space in conventional number work as if it were just another number.

The symbol for *zero* can, therefore, be considered as representing either:

(a) the limitless void, the *no-thing-ness*, full of the potential of universal consciousness in which no separate, discrete objects exist, or..

(b) a placeholder/gap-filler; occupying a vacant space in our decimal-based, EMU number system to denote that there are no units, tens or hundreds etc in their allotted places.

The zero point in the conventional *number line* raises further anomalies to be discussed later.

One: inclusive unity or exclusive unit?

The number **one**, can be treated either as representing a **unity**, a wholeness or *wholon*, inclusive of any number of parts OR as a single, separate **unit** of something, an exclusive part of a greater *wholeness* or *wholon*. This is the fundamental polarity of *whole* and *part* which are always *relative* terms. *One* can thus be either the biggest or smallest number.

In the manifest world there is always a bigger, inclusive whole/wholon/oneness containing smaller parts. By contrast, in the pre-physical, aethereal realm, the 'small' *point* can be seen as potentially containing or including all the 'larger' lines (and planes) that converge on it – like a town being the meeting point of a number of converging/diverging roads and railway lines.

A *wholeness* or *wholon*, in this work, is always taken to be a something with its own identity which is not merely the sum of its parts. Yet it is also a relative phenomenon, temporary, transient and in continuous interchange with the greater wholeness of which it is but a part. Simple examples could be a piece of ice floating in water or a vortex formed in moving water.

Fractions (from the same root word as *fragment*) express the *idea* of *oneness* divided into EMU *parts*, which are then separate symbolic units within that oneness.

The Number Line

From the *Threshold*, the traditional 'real number' line, with a *zero* at its midway point, raises questions. For the space occupied by zero seems to represent some kind of defined gap between -1 and +1, between the *negative* and *positive* dimensions. Yet by contrast, in time measurement, the 'year one' BC ran directly into 'year one' AD, with no 'year zero' in between - only a critical, *infinitesimal* moment of transition.

Western science does not yet openly acknowledge *universal consciousness* and the all-pervading aether. So *zero*, implying a distinct empty space situated between the negative numbers and the positive numbers, remains an *artifice*, an anomaly. This idea of zero is somewhat similar to the ideal in science of a so-called *perfect vacuum*, which doesn't physically exist in nature and is therefore a meaningless term, except as an abstract idea.

Such anomalies inevitably arise in a frozen abstraction like the number line – that is, an abstraction from a dynamic, ever changing reality in which two polar opposite forces are continuously and rhythmically interacting. Meanwhile, a revised number line could have its central balancing/mediating point serving as a portal through to the great void of pre-physical fullness also implied by zero. Two distinct symbols for zero would also help. The inherent *polarity and ambivalence* of zero would then be acknowledged.

Negative Numbers plus derivatives

To 'negate' means to deny the existence of something. *Negative* numbers express the *idea* of something not manifest or present in a *quantifiable* form, as opposed to the *actual*, manifest, positive presence of whatever it may be. That leaves a negative number as a *potential* or virtual something. A *debt*, for example, is a potential payment. A seed holds, in non-physical space, the potential physical organism it's destined to become, given the right conditions.

This realm of an unmanifest, ie non-physical existence is the very nature of the pre-physical *Aether*. Mathematical formulations derived from a *negative* value can therefore be understood as signifying the

subtle, potential, aethereal realm - the polar opposite of the *positive* numbers which signify the gross, manifest physical realm.

The symbol *i* and Imaginary Numbers

i officially represents the square root of minus one. However, it can be re-interpreted in the context of universal cosmic *polarity*. Mathematically, -1 is the product of combining, of multiplying together -1 and $+1$. There is no actual square or 'square root' here at all, but there is an ambivalent value, alternating between -1 and $+1$ and bestriding zero, Thus imaginary numbers seem anomalous because the EMU number system is inadequate for dealing in an inclusive way with the dynamic relationship between what's represented by negative and positive numbers and between zero and one.

Being the product of -1 and $+1$ places *i* right at the interface, the *Threshold*, between the numerically *negative* pre-physical and *positive* physical-material realms. And significantly, given the rhythmic pulsating of the cosmic polar forces, *i* is much used in practical engineering formulations concerning rhythm. So *i* symbolises that ambivalent state of the cosmos, with the two polar opposite forces represented by positive and negative values. A parallel in physics could be the idea of *matter* as vibrating energy patterns and *anti-matter* as its non-physical polar opposite.

Complex numbers, combinations of *real* and *imaginary* numbers, are thus symbols of ambivalence, and part of the bizarre *Alice through the Looking Glass* world referred to by Professor du Sautoy.

The symbol *e*, constant of growth

Given that a pulsating sphere retains its form throughout its rhythmic contracting and expanding, a constancy in the process has been identified by mathematicians, quantified and reduced down to the so-called *irrational* number $2.718...$ symbolised by the letter, *e* for calculating exponential growth or its polar opposite, shrinkage. The 'irrationality' represents an implicit admission that the dynamic, fluid, pre-physical realm cannot be precisely reduced down into the EMUs normally used to quantify the gross realm of crystallised, straight line, cubic forms.

Phi : the Golden Ratio/Proportion/Mean

The *Golden Ratio* represents a constancy of of proportion between the dimensions of ideal, potential forms in the *unmanifest*, pre-physical realm and those of actual, material forms in the *manifest* physical world. The numerical 'echo-ing' of the 'irrational' ratios, $0.618...:1$ and $1:1.618...$ suggests a significant relationship. And the widely acknowledged aesthetic quality of the *Golden Ratio* in architecture, art and design through the ages reinforces it as an intuitively sensed principle. This would seem to be because forms which are proportioned according to these ratios resonate harmoniously with the proportions inherent in the human body, shaped by a general pattern of the cosmic forces interacting.

The Fibonacci Series

The *Fibonacci Series* is a variation of the *Golden Ratio* principle. However, it only applies to the physical-material level of existence, after matter has come into being in the form of natural organisms. So it applies only in one direction, ie *growth* from *central* density (seed/egg) towards *peripheral* rarity. This could be the growth of an individual organism, as in various proportions of the physical body, a pine cone, or in the numbers of a breeding species.

The Golden Ratio and the Fibonacci series can each be expressed mathematically as a similar flat 2D logarithmic *spiral* which generates rectangles. The further out from the centre the spirals progress, the divergence between the two series diminishes. This also links the continuous, curved movement and change implied in the *spiral* with the separate, frozen-moment snapshot, dead and straight, but precisely quantifiable, *rectangles*... indicating a functional connection between the aethereal and the physical.

Pi: Across the Threshold between sphere and cube, circle and square

A straight line drawn radiating out from the centre point of a sphere or circle to any point on its periphery is known as the *radius*. The same line, but representing movement directed inwards from the periphery towards the focal centre point, could be called a *focus*. Thus the title of a *focus/radius* or *F/R* line would be more appropriate, all of them converging/diverging at the primary centre point.

In all spheres there will always be a direct and constant relationship between the length of the *F/R* line and other dimensions, as measured in EMUs of length, area and volume. Translated into EMU, decimal system numbers, that constancy is expressed through applying, in various formulae, the familiar, unresolvable numerical value represented by the symbol *pi*, approximated to 22/7, or 3.141....

A *Threshold* definition: **Pi** serves as the constant 'exchange rate' converter or scaling factor between (a) the D2D realm of the pre-physical *sphere* and (b) that of the 3D physical-material *cube*, as well as between their 2D derivatives, the *circle* and the *square*.

EMU calculations involving **pi** will always be approximations because of the fundamental *qualitative* difference between the rarefied, spiralling curves of the *pre-physical* realm and the dense, crystallised forms of the *physical-material* realm. A hurricane can be 'frozen' in a picture and reduced down to a pattern of quantifiable lengths, squares, cubes, velocities etc. But there's little understanding of the dynamics involved until we include the *context* of continuously changing, interacting atmospheric forces.

Ordinals / Cardinals and Ambivalence about counting

Along with the significant differences between *odd* and *even* and *positive* and *negative* numbers, two basic kinds of numbers are *cardinals* and *ordinals*.

Ordinals represent a marking out of *before-ness* and *after-ness* in a time *sequence*: 1st, 2nd, 3rd etc. They indicate a progressing process, more akin to the unmanifest, potential, living realm, implying a continuous, inclusive flow of changing conditions or stages, in time and space.

Cardinals represent amount or *many-ness*, how many of whatever is being referred to: 1, 2, 3 etc. They imply a fixed, static, finite, condition, a state akin to the physical, spatial, material world of separate, exclusive entities.

The clear distinction of meaning between them has become con-fused in everyday usage, with cardinals increasingly being substituted for ordinals, as a consequence of the current dominance of the *materialistic* mentality. For example:

9/11 refers to the 9th month and 11th day, whereas 24/7 refers to 24 hours, 7 days.
Chapter One actually means the 1st chapter, and Version 2 the 2nd version etc...

Threshold numbers, then, are those values – including **i**, **e**, **pi** and **phi** – which enable transition and transformation across the *Threshold*.

The Zeta Function

The *zeta function* is a mathematical device first applied to the primes by the mathematician, Euler. It was later elaborated by Riemann. The simpler version produces an *infinite* series of decreasing *reciprocals* from 1, 1/2, 1/3, 1/4... only when x , as the *exponent* or 'power' of the denominator, is 1.

Significantly, this coincides with the musical *Harmonic Series*, first established by Pythagoras, and so is relevant to the *inward* progression of diminishing resonant cavities. It also shows the **prime numbers** to be an *infinite series*. From the *Threshold* perspective, the zeta function symbolises the pattern of a real and fundamental process. It concerns the series of proportional *harmonic resonances* set up in the formation of the cosmos, as the following exposition on the prime numbers demonstrates.

Euler also discovered in the primes a convergence of *addition* and *multiplication*. The two functions were found to be working simultaneously, implying that they have a *dual* nature. Seen from the *Threshold*, multiplication, as in *geometric* progressions, is more about the *quality* of *proportion*, while addition, as in *arithmetic* progressions, is strictly about EMU *quantities* of units. This would suggest that the prime numbers represent values where the aethereal and physical realms coincide.

5. The Prime Numbers Enigma

What some scientists and mathematicians have said about the prime numbers.

“...The primes represent the most tantalising enigma in the pursuit of human knowledge...”

Cover blurb of *The Music of the Primes* by UK professor of mathematics Marcus du Sautoy (2004).

"Upon looking at these numbers, one has the feeling of being in the presence of one of the inexplicable secrets of creation."

Mathematician Don Zagier speaking of the primes, quoted in *The Mathematical Experience* by Philip J Davis and Reuben Hersh (1981).

Prime Numbers – The Most Mysterious Figures in Math.

Title of a 2005 book by mathematician David Wells.

God's Secret Formula – deciphering the riddle of the universe and the prime number code.

Title of a 1997 non-fiction book by scientist Peter Plichta.

Prime Obsession ...the Greatest Unsolved Problem in Mathematics

Title of a 2003 book about the prime numbers by mathematician John Derbyshire.

These quotes are included simply to illustrate the continuing fascination, particularly of mathematicians and scientists, with the prime numbers. Reading these books reveals how each author seemed intuitively to sense something special here which inspired him to write. Yet none was able to grasp what actually makes the prime numbers so significant.

Marcus du Sautoy, in his book *The Music of the Primes*, laid it all out with masterful clarity and flair - the big tease about the *primes*, that is. All about to be revealed... but then... hold on. Not quite yet. Ever closer but never quite getting there. What mathematicians call *asymptotic*: the line and the curve that are converging ever closer, yet never quite make contact. And that seems to symbolise the fascinating story of the *prime numbers*, the oldest unresolved mystery in mathematics (over 2000 years), on which perches the *Riemann Hypothesis* (1859), still neither proven nor disproven.

A key question is, What's been lacking in the experts' approach to these two enigmas?

(1) The '*distribution of the prime numbers*': ie the missing pattern in their occurrence in the normal number series of 1, 2, 3 etc, which has long been awaiting discovery and a clear explanation.

(2) The related and legendary *Riemann Hypothesis*, on which many other theories have been constructed, and which still awaits being proved or disproved.

From the *Threshold* perspective, further questions then arise, such as:

- Could these long running failures have been the inevitable consequence of asking the wrong questions, as a result of false assumptions, passed on unquestioningly through generations?

- And since the desired solutions have not been found after extensive expert analysis of the numbers, might it be more fruitful at first to ignore the numbers and look at their greater context?

This work is, therefore, more concerned with how humanity has come to think about quantifying and numbers than about mathematics itself and its various conundrums.

Kurt Gödel

It was the mathematician, *Kurt Gödel*, in the 1930s who showed that there are some statements which can neither be proved to be true nor untrue within mathematics, and that as a closed system, it cannot demonstrate its own consistency. This news was not welcomed by many of the leading mathematicians of the time.

The bigger picture

It is proposed in this work that the sequence of the *prime numbers* signifies something fundamental to human consciousness in understanding how the cosmos was and continues to be formed. So this aspect will be central throughout. At least a temporary acceptance of the basic *Threshold* principles is required in order to appreciate the resolutions reached. And since this is by no means an orthodox mathematical exercise, it may also involve some questioning of previously unquestioned assumptions.

However, the attitude behind this work is not 'anti-mathematics' in any way, but complementary. The approach taken is a re-examination of certain apparently unquestioned assumptions and habits of thinking. It is suggested that these may have been contributing to the problems all along, having been deeply embedded in normal' mathematical practice for many years.

Other broader questions persist. *What vital factor is missing that makes mathematics such a turn-off for so many, yet deeply fascinating in its rationality, elegance, complexity and beauty for a small minority? How significant is its exclusion of such essential human experiences as willing and feeling?*

For this omission leaves just the sterile, lifeless, mathematics most are taught at school and that Western science has adopted as its official language of authentication. Mathematics is, after all, just another human pursuit, a language, although a highly developed and specialised one.

The *Threshold* approach reveals that fascination with the *primes* and *Riemann* enigmas continues to grow because the primes are the key to some profound issues. They raise questions of a kind people are discouraged from asking or even contemplating in most mainstream cultures worldwide. Yet many well documented, speculative quotations from leading mathematicians allude to this profundity.

Meanwhile, to completely ignore a method such as this *Threshold* approach that solves problems which orthodox mathematicians have been unable to solve through centuries would amount to a kind of *denial*, an irrational, distorted emotional behaviour pattern familiar to psychologists and others.

In the text that follows it's proposed that Riemann's Hypothesis can neither be proved nor disproved because of two key factors: first, a lack of understanding of what the *prime numbers* signify in their greater cosmic context; and second, an incomplete conception of what *zero*, *one*, *two*, *half* and *imaginary numbers* signify, combined with an inadequate appreciation of what *negative* and *positive* values signify. Such failings seem to have been due to some long established false assumptions in Western culture about the nature of the cosmos.

Du Sautoy has said that mathematics is essentially "*ethereal*" and that the primes are "*timeless numbers that exist in some world independent of our physical reality.*" That would seem to be a promising starting place, although in practice the pre-physical aethereal realm is still mostly a taboo subject, a no-go area for orthodox mathematicians, despite any '*platonic*' tendencies some may have. And that is despite Albert Einstein's quoted warning that "*We can't solve problems by using the same kind of thinking we used when we created them.*"

Regarding the *pre-physical* realm, it's necessary to bear in mind that it does not consist of discrete, separated items, but is an ever changing continuity of different qualities, forces, tendencies etc – as those delving into the so-called 'quantum' world have found.

Primes: the fundamental question

So, the fundamental question here is: What does the sequence of the primes signify, given their unique properties,?

Other subsidiary questions about the primes include:

- Is there a mathematically sound formula for predicting the next prime number?
- How many primes are there up to any point in the normal number line?
- Can *Riemann's Hypothesis* (1859) be mathematically proved or disproved and so shed light on the mystery of the primes?

Two-faced primes

The *Threshold* view reveals that the primes have their own inherent *polarity*. They have two aspects, so to speak. A physical analogy would be a valve or duct connecting two distinct spaces and thereby simultaneously being part of both. *Euler's Product*, regarding the *multiplication* and *addition* of primes, affirms this quality and the significance of the *ordinal/cardinal* number relationship.

(a) *Primal values*: In the pre-physical order of the cosmic formative process is to be found a series of *primal values* which are essentially *ordinals*, ie the 1st, 2nd, 3rd etc *resonant cavities*. Each has its corresponding EMU prime number.

(b) *Prime numbers*: Within the EMU number system and 'natural' number line, primes stand as *cardinals*, each with its own distinct quantitative value.

These two aspects are qualitatively different. So their connection can only be inferred from a higher 'transcendent' perspective.

'Generating primes'

It follows that the expression 'generating primes' has two distinct meanings:

- (a) an ongoing cosmic *generative/formative* process in which those primal values, also known as prime numbers, are significant markers of proportion and resonance, and
- (b) mathematically *calculating* within the EMU number system.

So, establishing the generative/formative principle of the primes has priority.

Harmonics on the cosmic fretboard

A *focus/radius* line connects the periphery and the centre of the primal cosmic sphere, ie the original *resonant cavity*. The *standing waves* which constitute the inward series of concentric sub-spheres are intersected by the line at ever shorter intervals towards the centre. The line is thus marked out by the periphery of each cavity which resonates at a correspondingly faster rhythm or higher pitch.

A *harmonic order* means a series of notes in harmonious resonance with the *one* fundamental tone of the original resonant cavity. Another important distinction is that physical *sound* is objective and quantifiable whereas *tone* is a subjective, aetheric quality.

We can imagine a *focus/radius* line representing a string stretched along the neck of an imaginary stringed musical instrument whose hollow body represents the original resonant cavity. A series of frets along the fretboard surface of the neck mark out the proportionate distances along the vibrating string for producing particular notes within a harmonic order. This is done by pressing the string at the fret and thereby shortening its length.

Significantly, what are known as '*harmonics*' on stringed instruments can only be produced at certain frets. Harmonics are the subtle, higher, lighter sounding notes produced by plucking the string while

lightly and momentarily touching it over one of the appropriate frets. This makes the whole string resonate in harmony with the vibrating of its simultaneously shortened length – that is, instead of only the shortened length vibrating as a result of the string being pressed down hard at that fret. So, there would seem to be a correspondence between these special 'harmonic' fret positions and those points on a focus/radius line where it's intersected by the resonant cavities which only resonate with the original 'cosmos' cavity – ie *primal values* and their corresponding *prime numbers*.

At all other possible positions – or by implication, with all other possible sizes of resonant cavity – the result would be a clashing or subsuming of tones and a consequent cancelling out of *resonance*. That leaves only the *prime/harmonic* positions. So, the direct relationship between the resonance of particular shorter lengths and the whole length of the string parallels the way that prime numbers are only divisible by, ie only resonate with, *oneness*.

This also relates back to Pythagorus' *Harmonic Series*, and Robert Fludd's *celestial monochord* in 1618 which pictorially summarised the musical 'harmony of the spheres'.

The even tempered scale: an EMU imposition

Regarding harmonic systems, the Western 12 note, *even tempered scale* is an artificial, distorting, EMU, 'building block' modification. It has proved very convenient and creatively empowering in many ways – in particular for developing what might be called the 'architecture' of music. However, in imposing a distorted version of the natural harmonic system it has also inhibited the potential for certain subtly expressive forms of music, no longer possible when restricted by such a 'grid' system.

And the primes?

To recapitulate, the cosmic *formative* process can be summarised as follows.

-1: From the unlimited void/fullness of '**negative**' *Universal Consciousness*, beyond

0, the **zero** (*non-dimensional*) *Threshold* emerges as

1, the **oneness** of a pre-physical *sphere of potential manifestation*, forms around a *focal point* (*one-dimensional*), the periphery and centre together creating

2, the dynamic *two-dimensional two-ness* of the primal forces (**gravity/levity**) out of which arises a pulsating matrix/medium of primal, potential *energy*, the *aether*, within which

3, **three-ness**, is made up by the original *void* which is also the *Threshold* between them.

1-ness, **2-ness** and **3-ness** are thus fundamental principles and qualities of the pre-physical cosmic order, prior to its manifestation into physical-material form. And this process of **manifestation** is one half of the two-part cyclic process which includes the polar opposite, complementary progression of **redemption** back to the original state of oneness and universal consciousness.

So one whole cycle consists of **six** phases or stages, comprising three pairs of polar opposites, three inward and three outward.

So the cosmic formative process can be seen as a oneness producing two-ness producing three-ness (division/multiplication)... OR as a simultaneous state of oneness plus two-ness plus three-ness (addition). Whether multiplying or adding together 1, 2 and 3, the answer comes to 6, product or sum. This property is unique to **6**, known in mathematics as a 'perfect number'.

Six-ness and the primes

So what is the significance of *six-ness* beyond the symbolic arithmetic of $(1+2+3) = (1 \times 2 \times 3)$?

From the *Threshold* view, it can be seen as evidence of a corresponding pattern in the greater universal *reality*, the ongoing, dynamic, formative process of the cosmos.

Here is **one** cyclic process with a **two**-way polaric rhythm of **three** distinct phases. This works out not as a closed circle, but in the open-ended, spiralling cyclic way of the *vortex*. From the *Threshold* perspective of a cosmos in continuous change, *six-ness* can be understood as a unique quality of the cosmic transformative process.

Two arithmetic progressions, based on six-ness, contain all the primes

The polar opposite inward/outward directions in the *manifestation* and *redemption* of the physical cosmos can be expressed numerically as two *arithmetic progressions*.

One starts from -1 and the other from +1, with the constant increment, also known as the *common difference*, being **6**. Their combination is expressed in the formula $T_n = 6n \pm 1$.

As these progressions are extended, each new value that resonates with, ie is a multiple of, an existing one is subsumed by that prior value, and as a resonant cavity, disintegrates and is eliminated. So it has no separate identity or sound of its own. Eg 25 resonates with 5, and 35 resonates with 5 and 7. So each new number generated that resonates with, an already included number is automatically cancelled out, eliminated. That leaves only those numbers and resonant cavities which resonate solely with the original oneness.

These are the primal values and the prime numbers - no more, no less.

To summarise, the pattern in the occurrence of the primes, within the EMU number system, is as follows. There are two sequences of numbers, representing the two polar opposite directions described earlier. One of these starts with -1, representing *potential* one-ness, and the other starts with +1, representing the original actual resonant cavity, the cosmos. Each is an *arithmetic progression* with **6** as the constant increment.

Excluding 2 and 3 (the two essential factors of 6-ness, within 1-ness), the outcome is two sequences:

-1, 5, 11, 17, 23, 29, **35**, 41...

1, 7, 13, 19, **25**, 31, 37, 43...

When, after the exclusions, the two sequences, as EMU cardinals, are merged into one, the result is the familiar, previously undetected sequence of prime numbers.

An obscured double helix

The two progressions of numbers containing the primes can be represented graphically as a *double helix*, something familiar to biologists studying the basic chemical structure of living phenomena, DNA. The *double helix* also indicates a *bi-polar* pattern. See diagram to follow.

The 'twin' primes

From the parallel layout of the two progressions, as described above, the previously 'mysterious' occurrence of the so-called 'twin' primes – 5 & 7, 29 & 31 etc – becomes self-explanatory.

'Predicting the next prime' eventually comes down to deciding when it's no longer viable, technically and economically, to keep eliminating the infinitely increasing number of non-primes or composites, ie multiples of already included numbers.

The primes and the quantum/aetheral realm

The prime numbers sequence has been found to have correspondences with the so-called *quantum* realm. The connection was famously made first in a historic meeting between mathematician, Hugh Montgomery, and physicist, Dyson Freeman. This is not so surprising when it's realised, from the *Threshold* perspective, that the so-called quantum world, with its various non-physical and supposedly 'counter-intuitive' characteristics, is essentially an aspect of the pre-physical, bi-polar, D2D **aether**.

A Summary (of the significance of the primes)

The **prime numbers** are *cardinal* numbers, resonant only with number one, and correspond to the *ordinal* sequence of **primal values**. And the two sequences together form a distinct system, a **primal code** which leaves the non-prime 'composite' numbers as subsidiary.

The **primes**, as EMU numbers, represent a scale of markers or measures of the **cosmic formative process**, from the potential *pre-physical* aethereal realm to the realm of actual *physical-material* forms, developing through the principle of **harmonic resonance**.

As a coherent, rational and consistent explanation of the order of the primes, the *Threshold* account amounts to significantly more than a mere technical operation of arithmetical *elimination*, such as *Eratosthenes' Sieve*.

Ad infinitum = ad absurdum

Moving into the extremely large numbers and the fast vibrational rhythms of very small RCs, it all becomes inconceivable, inaudible, meaningless and irrelevant to the human scale of experience and appreciation. Which raises the question as to what benefit there might be in trying to explore the sequence of primes *ad infinitum* – except perhaps as an exercise in obsessive counting, or for devising ever more obscure encryption codes. However, both of these suggest an endless spiralling off into absurdity.

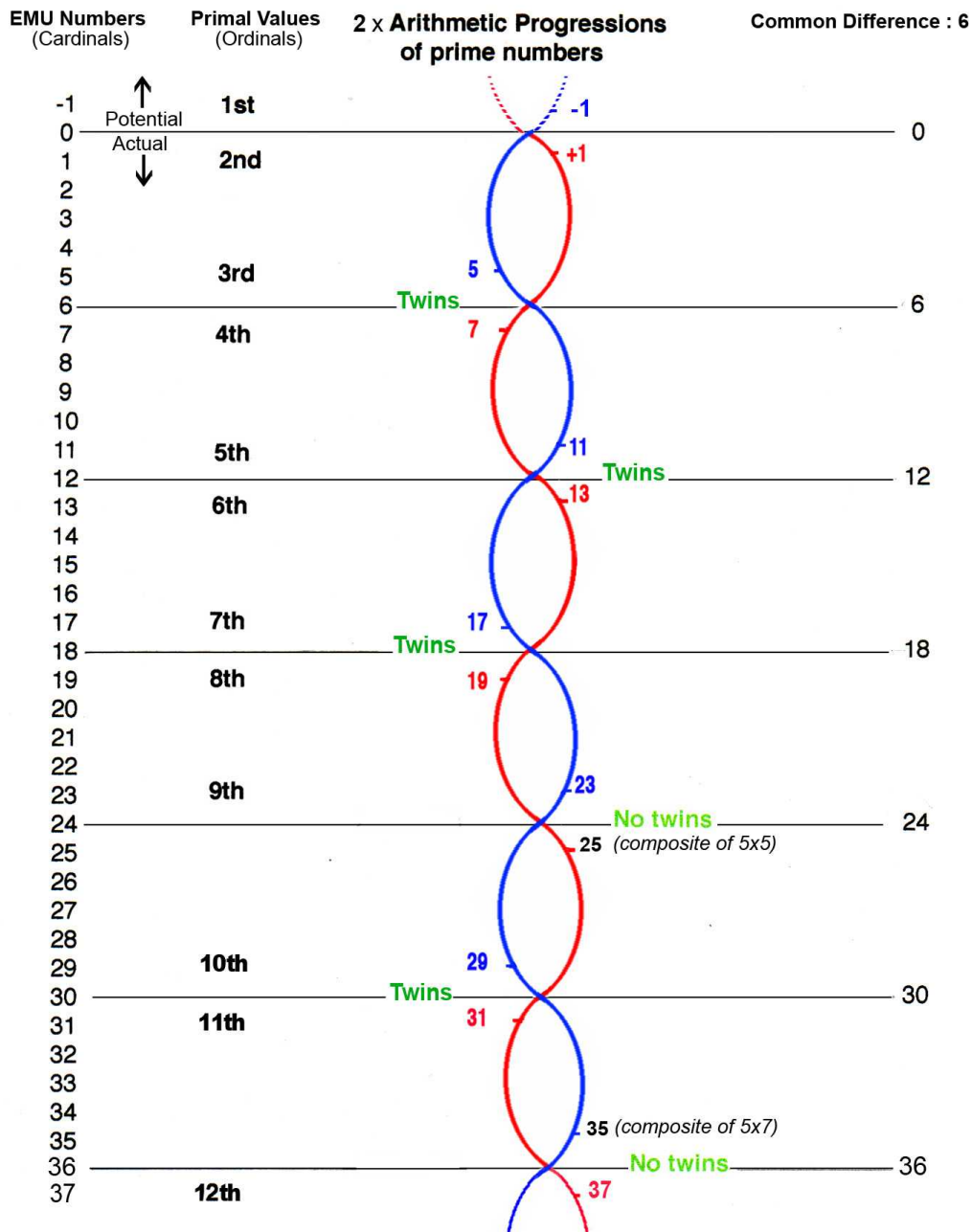
Beyond mathematics

In the 1930s mathematician, Kurt Gödel, established that some mathematical principles can neither be proved nor disproved from within the existing discipline of mathematics. The *Threshold* explanation of the coherence of the primes is not reducible down to either a concise algorithm or a formal 'proof', which emphasises their significance beyond current mathematics. Trying to so reduce it down to conventional formulae ends up in typically vain searches for some mathematical 'holy grail', as have attempts to prove or disprove the *Riemann Hypothesis*.

A new mathematical language has long been required to deal with the *pre-physical* realm, given its qualitative difference from the *physical-material* realm from which the EMU system emerged. And, as will become clear later in this work, certain improvements to the currently conventional *number system* are required.

The Order of the Primes

from *Threshold Mathematics* (2006)



All potential prime numbers, t , occur in the EMU number sequence according to the formula $tn = 6n +/- 1$
Actual prime numbers occur in accordance with the series of *primal values* –
 that is, all the potential primes less those *resonant* with, ie a multiple of, a prime number already in the series.
 EMU cardinal numbers 2 and 3 are integral to the 6-ness of the two arithmetic progressions,
 and fit the EMU definition of a prime number, but do not correspond with the series of *primal values* (ordinals).

4. The Riemann Hypothesis (1859)

'All non-trivial zeros of the zeta function have real part one-half.'

'All non-trivial zeros of the zeta function lie on the critical line.'

The *Riemann Hypothesis* is here taken to be an inspired speculation about a particular and significant pattern intuitively sensed by the outstanding 19th century mathematician, Bernhard Riemann. In 1859 he gave it expression in the form of a mathematical model, combining numerical and graphical elements.

The idea emerged as a spin-off, an unexpected by-product of other work on the prime numbers in which he was then engaged. He speculated the existence of a 'critical' infinite line of zeros generated by his modified version of the *zeta function*, incorporating *complex numbers*. This suggested a then unrealised order involving the prime numbers.

A doomed model / polarity ignored

It's suggested here that no one has been able to prove or disprove *Riemann's Hypothesis* because it is based on some long established false assumptions in Western culture about the fundamental nature of the cosmos. These have resulted in an incomplete conception of what *zero*, *one*, *half* and *i* (symbolising imaginary numbers) mean, as well as an inadequate appreciation of what *negative* and *positive* values signify in their broader cosmic context.

The *Threshold* principle of universal *polarity* is here taken as assumed. So any particular aspect of the greater reality signified by a mathematical symbol will always have its polar opposite aspect. Failure to apply this principle can result in confusion.

The *Threshold* perspective thus reveals that *zero*, along with all other number values, has both a *major*, *qualitative*, *inclusive* and a *minor*, *quantitative*, *exclusive* aspect. However, in Riemann's era of increasingly materialistic thinking and still today, only the *minor* aspect, 'little zero' – as a gap-filler between numbers – seems to have official recognition.

An exercise in unlearning

Consequently, this investigation of the Riemann Hypothesis enigma is very much an exercise in questioning old assumptions, unlearning and abandoning some redundant teachings and untangling knots resulting from these. All in all, it's a kind of opening up of previously locked doors and windows in order to benefit from a fresher, lighter, more expansive atmosphere. As in everyday life, this is not always welcomed by everyone.

A cautionary thought

Converting number patterns into geometric, quasi-physical/spatial structures, as Riemann did, can be a useful device for visualising connections etc. However, it can also result in potentially misleading false metaphors, such as rigid images where fluid patterns become established 'fixtures' as lines, areas, distances, directions etc.

Back with big and little zero

In the normal workings of the decimal number system, *little zero* occupies a position, a space in a grid, as if it's just another 'building block' number with its own specific value, ie nil.

By contrast, in a *number line*, which essentially represents an *order*, a zero serves as a marker, a transition point with no intrinsic quantitative value – just as in the practical world of normal thinking, outside of abstract mathematics, there is no gap between the years IBC (-1) and IAD (+1), ie no 'year zero'. Here zero marks only a crossover or transition point, a *threshold* in a greater flowing continuity.

So, given the universal principle of polarity, **little zero** serves as a space-filler, a symbolic point or portal of no substance or numerical value in the grid/column/EMU number system. Meanwhile, **big zero** represents the *threshold* or *border/interface/field/plane/line* of no substance or value at the transition level between:

- (a) the infinite, pre-physical, unmanifest, potential/virtual, *negative* realm, and
- (b) the finite physical-material, manifest realm of forms and positive numbers.

Zero does not, therefore, simply represent 'nothingness' in contrast to the 'somethingness' of the realm of positive numbers. It has an intermediary role in a number line. It stands numerically midway between -1 and +1.

So, viewed from the physical 'side', beyond zero there lies the potential/virtual and essentially non-quantifiable *negative* realm. This is only made quasi-quantifiable ('as if' quantifiable) by artificially 'projecting' positive values on to it through an act of imagination, creating artificial images and a mathematical mirage.

And in this exercise of the imagination lies a clue to the meaning of the 'imaginary numbers', represented by the letter **i**.

The ambivalence of imaginary numbers

Riemann had already been working on the primes using *complex numbers*, combinations of *real* and *imaginary* numbers. *Imaginary number* values are signified by the letter **i** which officially represents the 'square root of -1'. But this is a piece of pure mathematical jargon. No actual square is involved, and so 'square root' is here a meaningless term.

-1 is the product of multiplying together -1 and +1. So **i** is an *ambivalent* value, *alternating* between -1 and +1 (across the 0 transition point). This alternating quality of **i** is key to its use in practical calculations involving phased and other rhythmical processes.

A basic model reveals...

Assuming a west/east number line of, say, -10 to +10, crossed at its *zero* marker point by a north/south line, all values on this N/S line would automatically be zero, since this line, midway between -1 and +1 graphically represents the interface, the *threshold* between the negative and the positive realms.

This critical N/S line can also be taken to represent a *plane* at the interface between:

- (a) the realm of *potential*, pre-physical manifestation, ie *negative values*, eg debt, seed power etc... and
 - (b) the realm of *actual*, physical-material manifestation, ie *positive values* of discrete forms and objects.
- Thus the mathematical symbols here remain connected to the wider context and reality.

Riemann's 'landscape' model

Riemann's model comprised a triple axis graph which produces an artificial 3D image resembling a landscape within which his 'critical' infinite line of zeros is generated.

Axis 1 is the west/east real number line with west as the negative side, east as the positive side and the *zero* marker positioned midway between positions -1 and +1.

Axis 2 is a north/south line of *imaginary numbers* intersecting the W/E line at + $\frac{1}{2}$.

Axis 3 is a vertical line extending upwards and creating a further dimension, stretched out along the N/S line. This represents the output of all **i** values along the N/S line, fed into Riemann's *zeta function* – which itself incorporates *complex numbers*, real and *imaginary* numbers added together.

Apparently, to Riemann's surprise, the intersection at + $\frac{1}{2}$ unexpectedly produced the 'critical' line of zeros which he then speculated is 'probably' an infinite series.

What is a half?

The abstract mathematical term *one half* ($\frac{1}{2}$) signifies the *quality* of *half-ness* which is a relationship of

proportion or ratio between one-ness and two-ness. It does not itself represent any specific quantity or entity. Like such terms as *majority* or *minority*, it can only describe a particular *quantitative quality* of something. In this respect, $\frac{1}{2}$ describes an entity as being one of a pair of two equal component parts which comprise a greater single entity. In the physical world, two halves add up to one whole only when they are both halves of the same thing. Only in the abstract world of mathematics can two halves of nothing in particular add up to one.

The principle of $\frac{1}{2}$ signifying the dividing of one entity into two equal parts (halves) is universally applicable to the physical world. So there can be a half of just about anything: a half-litre, a half-century, a halfway point of a journey etc. But the symbol $\frac{1}{2}$ on its own does not itself represent an actual quantity of anything: amount, size, weight, duration, power etc. Only when it's applied to a specific substantive situation will the result be a quantifiable value, ie $\frac{1}{2}$ of something. Mathematically, this involves multiplication by $\frac{1}{2}$ (or division by 2). An abstract half (ie of nothing) cannot meaningfully be added to anything else, such as an imaginary number.

Confusion in a number line?

Confusion seems to arise when the symbol $\frac{1}{2}$ appears on a *number line*, ie as a *marker* in the way that zero marks the midway point between, say, -1 and +1. The role of the abstract symbol $+\frac{1}{2}$ is to indicate a location midway between the points marked 0 and +1, and as such a marker, it has no inherent quantitative value itself – just as the point between years IBC and IAD has no inherent numerical value.

It seems that Riemann took the $\frac{1}{2}$ marker on his W/E number line to have an intrinsic numerical value. This was then combined with, ie added to, the series of values produced above the N/S line which crosses the W/E line at the point marked $+\frac{1}{2}$. These values are derivatives of *imaginary numbers* - which have an ambivalent value alternating between *negative* and *positive*, as shown earlier – and the combinations are *complex numbers*.

The result, according to Riemann, was 'probably' an infinite series of *zeros*, forming his *critical line* - which does not seem surprising, since $\frac{1}{2}$ of nothing plus an indeterminate 'imaginary' value would seem inevitably to have no numerical value, ie to equal zero.

The *critical strip* in Riemann's model designated by contemporary mathematics, within which all the zeros are supposedly proven to lie, extends $\frac{1}{2}$ unit either side of the line at $+\frac{1}{2}$, and so just about includes at its western extreme the N/S line at zero proposed by *Threshold Mathematics*. This 'zero' position for the line of zeros would also seem to resonate with Euler's logic.

For Riemann's inspired idea of a critical infinite line of zeros - his envisioned *destination* of a metaphorical sea level path in his 'landscape' - was all the while accessible via a much more direct and simple route, already implicit in Euler's zeta function. But the mathematical complexities of Riemann's artificial landscape appear to have distracted him and others from grasping the simpler, bigger picture he'd intuitively sensed.

The idea also seems to have come to him only when he was already mentally in the (mathematical) 'territory' requiring a longer route to 'zero level', and so perhaps didn't even consider the possibility of a simpler, more direct one.

The bigger picture

When Riemann's visionary infinite *line* of zeros is seen as graphically representing a *plane*, it suggests an early intimation of what's recently become known as the *zero point field*. This plane, from the *Threshold* perspective, is the dynamic interface between the pre-physical (-) and the physical-material (+) realms. As such, it can also be understood as an illustration of the **Threshold** which is the basis of this work.

So the 150 year old intractable problem of no one being able to prove or disprove Riemann's intuitive hypothesis now looks to be a question of whether or not his complex route can somehow be mathematically validated.

It would seem not to be so - whereas, according to the principle of *Occam's Razor*, the shorter, direct route, indicated by the *Threshold* perspective, offers the most efficient way of clearly stating the fundamental principles involved.

Thus the enigma of the *Riemann Hypothesis* is clarified and resolved, as neither provable nor disprovable.

7. The Goldbach Conjecture (1742)

'Every even number over 2 can be represented by 2 prime numbers.'

Goldbach asked the great mathematician, Euler, if he could prove this apparently true statement. But Euler couldn't, and no one since then has. So given that mathematical 'proofs' only have meaning within the rules and logic of mathematics, this would seem to affirm the assertion of another great mathematician, Gödel, that new axioms may be required in such cases.

The '**even number**' is an EMU concept. The EMU number system, as explained in **Threshold Mathematics**, is one expression of the materialistic '*grid*' and '*building block*' mentality regarding space, time, quantity and the universe.

Primal values, as also outlined in *Threshold Mathematics* and *The Primal Code*, are *ordinal* values representing the pre-physical 'inward' series of concentric spheres, *resonant cavities*, generated by *harmonic resonance* in the formation of the cosmos. They are the original essential forms which can be abstracted and symbolised as the *prime numbers*.

The *primal value* system is thus prior to and beyond the EMU system of *cardinal* numbers, making the two systems mathematically incompatible.

The **Primal Code** which links them is an ordered, infinite sequence of both *primal values* and *prime numbers*, marking out a cyclic process of cosmic *manifestation/redemption*.

From the **Threshold** perspective, the logic then works out as follows:

What makes the *primes* extraordinary numbers – apart from their being not divisible by any number other than one – is the extra quality they possess beyond the scope of the EMU cardinal number system. That is, their significance in the cosmic formative process.

The Primes are explained in *Threshold Mathematics* and *The Primal Code* as both:

(a) *Ordinal* symbols, signifying a sequence of cosmic resonant cavities, ie **primal values**, and

(b) *Cardinal* values, expressed as abstract, EMU, **prime numbers**.

(Primes larger than 2, within the EMU number system, are thus all *odd cardinal* numbers.)

This gives them their dual identity and function, ie their two distinct but complementary aspects, like a valve or duct which works simultaneously in two 'worlds', a demonstration of *polarity*.

To try to define primes in terms of only one of their aspects, ie the EMU number system, would inevitably produce inadequate, confusing and paradoxical results. So what fundamentally distinguishes primes from non-primes is their extra, pre-EMU dimension as *primal values*.

Even numbers

- *Even numbers* indicate the abstract idea of a **pair** and as such, do not specify or explain the substance or constituents of the two parts of the pair as actual, real entities.

- *Even numbers*, in EMU terms, can comprise a pair of equal values or other combinations of EMU numbers, namely:

- *Symmetrical* pairs of identical *evens* or *odds*, eg $2 + 2 = 4$ and $3 + 3 = 6$,

- *Asymmetrical* pairs of non-identical *evens* or *odds*, eg $2 + 4 = 6$ and $3 + 5 = 8$.

So every even number can be represented by a pair, a *two-ness*, of odds or evens.

Two-ness is essentially two *one-nesses*, and *one-ness* is a quality solely of the number *one* and the *primes* (each prime being a 'one-off').

Therefore, **every even number** (as a *two-ness*) **can be represented by two primes**.

The Becoming (of Cosmos) (see **Threshold Mathematics**)

distinguishes pre-physical *time* from physical-material *space*, and thus explains:

- (a) how *quality* is prior to *quantity*,
- (b) how the *one* original sphere is prior to and contains the *many* sub-spheres,
- (c) how the idea of *numbers* developed out of the cosmic *descent into matter*.

No pure 'equality'

The process of *universal consciousness* focusing and creating 1-ness, 2-ness, 3-ness...

which involves rotating, spinning, vortexting, ie continuous *movement*, affirms that:

- in cosmic reality, no two physical entities can be exactly equal – only approximately,
- but in mental, abstract, ideal, EMU *mathematics*, 'identical' equality and *even-ness* is possible.

So **Euler** could not prove the correspondence of EMU *even* numbers with *prime* numbers because the *primal value* system underlying the primes is *ordinal*, prior to and beyond the EMU system of *cardinal* numbers... and the two systems are thus not compatible.

Goldbach's Conjecture, limited to EMU number logic, consequently has the paradoxical quality of being demonstrably true but not 'provable' within the logic of mathematics, affirming Gödel's 1930s irrefutable assertion.

A longer view

Imagine a child who has not experienced, directly or indirectly, a nuclear family situation comprising two parents and their offspring, and who is also ignorant of the process of biological reproduction. It cannot be convincingly 'proved' to the child that every individual person has, ultimately, two progenitors, a particular male and a particular female – for this is an alien concept to the child's worldview. The child's mind is not yet developed or informed sufficiently to comprehend the bigger picture and its governing principles. So the child functions with a limited worldview based on whatever phenomena he or she has experienced so far.

A person with a mathematical worldview that has not extended beyond the abstract EMU system taught in childhood is not yet opened up to the bigger, prior picture within which the limited EMU system arose, and so functions, in this respect, with a limited understanding.

Threshold Mathematics shows how the familiar and useful but limited EMU number system, unquestioningly used worldwide every day, emerged from a prior situation with which humanity is not so familiar. In order to overcome this limitation, humanity needs to expand its current worldview, including its mathematics, to incorporate some awareness of the *pre-physical* world. Addressing *Goldbach's Conjecture* here has opened up this possibility.

8. A Concise Resolution of Fermat's Last Conjecture

$x^n + y^n = z^n$ has no whole number solutions for n greater than 2.

Axioms

(1) There are at least two kinds of spatial two-dimensionality:

- (a) the primary *dynamic* symmetrical expansion/contraction between the centre point and periphery of a sphere or spheroid, D2D, which produces the secondary form,
- (b) any planar 2D surface, an area on which spatial relationships can be represented by the use of diagrams and symbols.

(2) Circles in geometrical formulations displayed in flat planar 2D may be taken as abstractions representing spheres and, similarly, ellipses may be taken to represent spheroids in the world of forms beyond mathematics.

Prologue

According to Gödel's first *Incompleteness Theorem*, there are some true statements that cannot be proved within the currently prevailing number theory of mathematics.

This present approach views *Fermat's Last 'Theorem'*, which is essentially a conjecture, as the outcome of a 3-level, 2-stage reduction and abstraction operation, postulating a logically consistent constant principle, encapsulated in the formulation $x^2 + y^2 = z^2$. The 3 levels are:

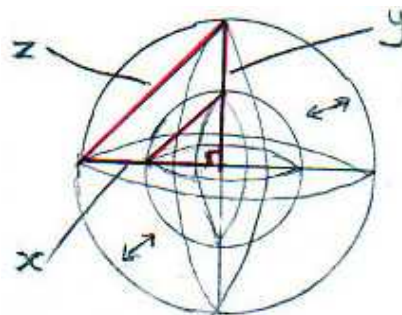
Level 1: the cosmic *dynamic* 2D realm, D2D, of actual expanding/contracting spheres and spheroids, reduced down, ie encoded, into:

Level 2: the flat, static, *planar* 2D realm of such Euclidean geometric forms as circles, ellipses, triangles and squares, further abstracted and encoded into:

Level 3: the algebraic, *symbolised* formulation $x^2 + y^2 = z^2$ which Pythagoras proved, within the limited mathematical logic of his time, to express a constant principle regarding right-angled triangles. In these, x^2 , y^2 , z^2 symbolise, in flat planar 2D, three square areas based on the three sides of the triangle. Pythagoras proved that in all right-angled triangles, if z is the hypotenuse, then $x^2 + y^2 = z^2$. Instances of *Pythagorean triples* are where x , y , z are 3, 4, 5 or 5, 12, 13.

The size of a sphere is defined by its radius. The size and shape of a spheroid is defined by the radii of the two perpendicular cross-sectional planes bounded by great circles, which remain in constant mutual proportion during expansion and contraction of the spheroid.

In a circle or ellipse representing, in flat planar 2D, a sphere or spheroid, where the line representing the axis of one such great circle intersects the perpendicular line representing the axis of the other, a right angle is formed.



Method

In flat planar 2D, let the points where the radii x and y meet the perimeter be joined, creating a line z , so that lines x, y, z form a right-angled triangle with z the hypotenuse.

This can be taken to represent a D2D situation in which the centre point of a sphere or spheroid is connected by straight lines to two points on the periphery.

As the radius of the circle or the radii of the ellipse vary, proportionality among the angles and sides of the created right-angled triangle remains constant.

Conclusion

2 steps connecting the 3 levels:

1. Within the rules and conventions of current mathematics, the algebraic formulation $x^2 + y^2 = z^2$ can always be abstracted from the above flat planar 2D geometric formulation of a right-angled triangle set within a circle or an ellipse.

2. After Gödel's lesson on the necessity sometimes to extend beyond current mathematics, the idealised flat planar 2D geometric forms of the circle and ellipse can always be derived from the D2D actuality of an expanding/contracting sphere or spheroid.

So, any right-angled triangle can be construed as a *flat planar* 2D abstraction, derived from a sphere or spheroid, which are primal forms that vary in scale solely in D_{2D} , *dynamic 2D*.

Given that derivation, proportionality among the angles and sides of any right-angled triangle remains constant only in 2D. This limiting principle is symbolised in the algebraic formulation $x^2 + y^2 = z^2$, proven by Pythagorus, in which the exponent 2 represents the 2-dimensionality of the geometric squares based on the sides of the triangle.

Raising the value of the exponent n to 3 and beyond creates geometric progressions which step by step increase the difference between $(x^n + y^n)$ and z^n .

Thus there is a consistent logic throughout the three levels which shows that the formulation $x^n + y^n = z^n$ is only valid when the exponent is 2.

Therefore $x^n + y^n = z^n$ has no whole number solutions for n greater than 2.

Afterthought

"No problem can be solved from the same level of consciousness that created it." Albert Einstein

This resolution has been reached through a process of *reverse engineering* – logically tracking back from the part to the whole, from the finished product, an algebraic formula about a particular kind of 2D geometric triangle, to certain universal principles beyond current mathematics.

9. Mathematics at the Threshold

What vital factor is missing that makes mathematics a turn-off for so many?

The brief answer is: What's missing is one 'side' of the great cosmic equation – the equation, that is, which summarises the inherently balanced *polarity* of the whole cosmos. Missing is the *pre-physical* dimension: *universal consciousness* and the intermediary level of being, the *aether* or *quintessence*.

All energy and forms arise out of the rhythmic interplay of the two primal polar opposite forces of the cosmos, *gravity* and *levity*. And all force must originally at some level be *exerted* by some motivating power source or act of will – which is not to imply any mystical or religious notions.

In recent centuries the objective, physical-material aspect of our world has been studied in great detail by scientists, but to the neglect of *consciousness* and the *aethereal* dimension. So, regarding mathematics, the missing half is all about how to study the *subjectively* experienced *qualities* of quantities, as well as measure, count, name and calculate quantities in an *objective* way.

Archimedes and Plato

As stated earlier, a UK professor of mathematics recently responded to an earlier version of *Threshold Mathematics* by quoting Archimede's famous statement about leverage, 'Give me somewhere to stand, and I will move the earth.' He was affirming the idea of changing one's perspective so that everything shifts and a whole new understanding is gained. As stated, he also thought that most mathematicians are *platonists*, and in Plato's time the *aether* was considered a living reality.

Assumptions not questioned

The whole *primes/Riemann* saga seems to have arisen from a lack of openness or willingness to question some basic assumptions behind what is currently taught as mathematics. The result of this rigid orthodoxy is a huge 'cloud' of abstract thoughtforms hovering over mountains of academic papers – which represent the collective attempt to rediscover the *coherence*, elegance and clarity longed for by so many agile and creative minds, intuitively aware that it does exist but lacking the right mental tools for the job.

The advent of the binary, digital computer hugely boosted mathematical pursuits, both in scale and speed. But in the rush, other ways of thinking, not reducible to binary logic, have become further neglected, resulting in an even more distorted imbalance. Constructing a system, a world, of mathematics with EMU building blocks and grids has proved very useful and also an endlessly fascinating subject in itself for some. However, to expand mathematics beyond the limits of that constricting worldview would require a much more inclusive, flexible, organic and aethereal way of thinking.

What is it about mathematics?

Only when the human mind rises above and beyond the current mathematical mindset – with its 'grid-filter' and 'building block' thinking – does it become aware of just how trapped it has been in the *abstract/materialistic* culture of quantifying and numbers. This way of thinking has been assimilated from infancy when there would have been no awareness of the process.

A youthful talent shown for numbers and calculating is often rightly encouraged, but without a counterbalancing development of the sense of wholeness, continuity, quality and so on, minds can become distorted. And all the more so in cultures where people are programmed to admire *cleverness* or *smartness* but to devalue *wisdom*, and where an over-emphasis on *analysis* at the expense of *synthesis* is rewarded with certificates, prizes and praise, leading to career and financial advantages.

The flip side of this, meanwhile, shows in the idealised yearnings and tendencies of some mathematicians – as if to find some kind of compensation for their entrapment. They intuitively know that there are higher, coherent principles at work in the cosmos beyond what is translatable into the highly complex but still limited language of EMU mathematics.

The cold, sterile, precise, idealised, abstract qualities mostly associated with mathematics - which make it such a pure, detached, feeling-free discipline - evidently have their appeal to a small minority of people. But this attraction can also be seen psychologically as a means of escape from the messy, emotional and physical-material worlds of distorted, compromised ideals. For the obvious passion with which some mathematicians seek to discover new truths and resolve mysteries speaks of something much more than formal mathematics. Professor Marcus du Sautoy refers to the high proportion of musicians who study mathematics.

Seductive to scientists

Materialistic scientists who deal with the untidy, physical-material world often seem to have a strong sense of higher/deeper principles at work in the cosmos, as the broad genre of 'science fiction' indicates. Perhaps this is why materialistic science in general has been seduced by the mystical magic and power of abstract mathematical symbols, numbers, formulae and so on.

These help create an *idealised* world of clean, precise, controlled and ordered procedures – unlike the *real*, chaotic, tangled, messy and unpredictable *physical* world of continuous change. Also, the more that *uncertainty* prevails, the more refuge scientists seek in the illusory stability of mathematics, quantum physics being an outstanding example.

Entranced by numbers

Also, becoming fascinated and bewitched by the endless potential permutations mathematics offers can lead to a 'not seeing the forest for the trees' – as well as to a confused culture of endless statistics and counter-statistics. It's as if there is a heartfelt, intuitive knowing and longing for a deeper understanding of this world. Yet most seem trapped in the *grid-view, building block* mindset, within a career structure and culture that eventually sabotage that driving, creative urge.

The great fascination with the enigma of the *prime numbers* and the *Riemann Hypothesis* seems to be a case in point, as a \$1 million reward in the year 2000 for its solution and various books and websites confirm.

The flawed assumption has been that *the answer must lie in the numbers* – an approach taken to painfully obsessive extremes in Darren Aronofsky's film *Pi*. For the central character in this, an extremely intense mathematician, numbers took on hugely inflated significance. His quest to find answers to big questions by endlessly analysing stock market statistics and other numbers proved futile and frustrating, driving him to the point of insanity.

10. Postscript

So the *Threshold* perspective is not merely a fanciful idea, but does provide a useful perspective on how human beings fit into the bigger cosmic picture. And it also enables clear, coherent, consistent solutions to be found to some longstanding enigmas of mathematics.

Intuition + intellect

At the *Threshold*, the *subjective/objective* divide is transcended through realising the ultimate identity of our *individual* consciousness with *universal* consciousness. This is an *intuitive* mental process beyond intellectual, rational or computational operations. And since this reaches into realities beyond the physical-material realm, certain precautions are required. Any conclusions reached must be subjected to intellectual scrutiny to test their practical validity. In the present work, for example, the rational consistency and wider significance of the prime numbers, as demonstrated, provides such validation.

Mathematical models: how real?

The limitations of abstract mathematical models, as tools for scientific investigation into the real world, can induce a strong temptation to make observations fit the model – especially when the model offers an attractively self-consistent approximation which may itself start to become accepted as unquestionable dogma, a false 'fact'.

Reality beyond matter and mathematics

From the *Threshold*, humans can see themselves as units of consciousness embodied in dense matter, as a result of the *descent* described earlier. However, some still act as though matter is the ultimate reality and not consciousness, despite Einstein's widely accepted teaching that matter is condensed energy.

Meanwhile, *energy* itself has remained an enigma, as Nobel laureate physicist, Richard Feynman stated. That is, until scientists acknowledge that primal energy is essentially what's generated by the cosmic *levity/gravity* dynamic within universal consciousness.

The crucial move into thinking beyond mathematics involves recognising the continuously shifting, dynamic processes going on behind all illusory images of a static, crystallised world – that is, beyond the comfort and false safety of idealised, controllable, manipulable, abstract symbols representing artificially standardised quantities.

New thinking, new terms

Inevitably, the *Threshold* perspective requires some new terms and symbols to handle an extended vision of wholeness, polarity and resonance. However, that's beyond the scope of this particular paper, the intention of which has not been to reject current mathematics but to introduce the power of the timeless *Threshold* perspective.

From this perspective, it's also clear that the mathematical quest to find ever more pattern and order in the cosmos is, in principle, a sound one, since in this work coherence and order have been shown to exist behind the apparent *randomness* – a term which only speaks of an inability to comprehend the many factors affecting particular situations and outcomes.

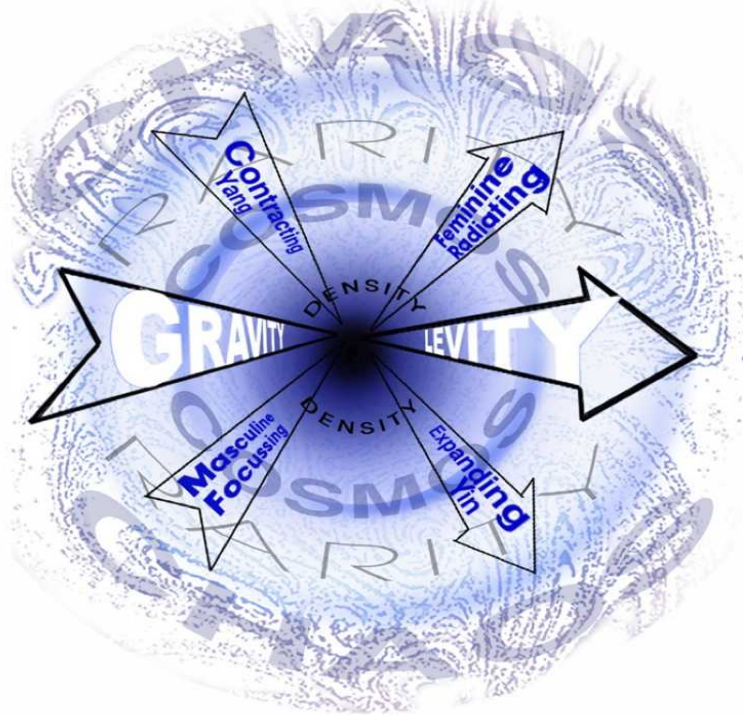
Consequently, mathematics will evolve to include such fundamental qualities as consciousness, wholeness, continuity, universal polarity, resonance and proportion – and in more than just a sterile, quantitative way.

And finally, because this *Threshold* perspective cannot be reduced down and forced to fit into the narrow confines of any materialistic-mechanistic, 'boxed in' way of thinking, this does not diminish its validity in the greater context of humanity's evolving consciousness

**Brief notes
anticipating future work**

Dynamic Diagram Language

Polarity: the Primal Cosmic Dynamic



The Three Primal Principles

1. **Consciousness**: the original universal animating principle of the Cosmos
 2. **Polarity**: the dynamic between the primal inward and outward cosmic forces, Gravity and Levity..
 3. **Resonance**: the vibratory rhythmic interaction between different parts of the Cosmos which may be consonant, ie harmonious, or dissonant ie conflicting.
- NB. The universal principles of masculine and feminine are not the same as male/female gender.

D2D (Dynamic 2-dimensionality)

Initiating a new mathematics of the pre-physical order

The D2D realm is the product of the ongoing pre-physical *expansion* and *contraction* of the cosmos, generated by the continuous rhythmic interaction between the primal forces of *levity* and *gravity*. This dynamism is what distinguishes it from both (a) the more familiar planar 2-dimensionality, and from (b) the conventional box-like, cubic grid conception of 3D space.

The Becoming of individual I in D2D,

As described in *The Becoming* chapter of *Notes from the Threshold*, *universal consciousness*, aka *universal I*, focuses 'inwards' and establishes within the already functioning *cosmos* this focal point, a sub-centre which becomes *individual I*.

(NB Here the term 'sphere' includes asymmetrical spheres, distorted by forces external and internal.) And while the cosmic forces of *levity* and *gravity* continue jointly to generate *primal energy*, as they tend towards a state of equilibrium and redemption, this sub-centre radiates such energy, forming its own pre-physical pulsating sub-sphere.

'I breathe the cosmos'

For future mathematical purposes, we can identify our individuality with universal consciousness in a direct psycho-physical way through a simple breathing exercise.

First, sense the centre of your individual being as the crossover point at the centre of your heart. Now, as you stand erect, your body forms a vertical line relative to the planet's horizontal surface.

You also realise that you're physically in alignment with a non-physical line which extends outwards and inwards between the centre of the planet and the greater cosmos.

Then, as you inhale, shift the focus of your attention from the centre of your being further 'inward', through the centre of the Earth and deeper, creating a line to and from the centre of the cosmos.

Meanwhile, bear in mind that you are an integral part of the cosmos, despite being temporarily separated within your individual physical body and energy field – which is also your own 'sphere of influence', ie your own active, participating unit of consciousness.

So, you are now identifying with the whole pulsating cosmos, as far as this is possible for the limited minds of incarnated human beings.

Then, as you exhale, shift your attention instantly back to the centre of your heart, within your own 'bubble' of consciousness, and resume your life as an individual human being.

This exercise tells us that we can instantly and effortlessly shift the focus of our attention, ie our individual consciousness, to and from the centre of the conscious cosmos without encountering resistance, impedance or delay,

through the timeless pre-physical medium, known since ancient times as the *aether*.

In so doing, we also create subtle lines of force through this medium,

lines which can be represented, in a limited 2D or 3D way.

However, at the pre-physical level of ideas in consciousness, these are not necessarily the straight lines or geometric curves of the physical-material realm.

These factors, all taken together, are key to understanding the otherwise inexplicable and so-called 'counter-intuitive' findings of quantum physics, labelled as *nonlocality*, *superposition* and *entanglement*.

Perhaps with the new super-sensitive detectors now being developed at the LHC in Cern, this *Threshold* realm may begin to be recognised and acknowledged for what it is, instead of being misinterpreted and reduced down to the physical-material language of physics.

Concentric Sub-spheres,

All pre-physical sub-spheres are formed from the *spherical standing waves* set up by the pulsating of the cosmos, and function as *resonant cavities*.

Each sub-sphere is concentric with the cosmic centre, and pulsates to a sub-rhythm of the cosmic pulsation.

So, all sub-spheres are organised in a concentric order.

But, being pre-physical and therefore fluid and interpenetrating, they do not function in the same 3D spatial way as physical spheres or bubbles.

Because the sub-spheres closer to the cosmic centre of maximum gravity are more densely concentrated and smaller, their vibratory rhythms are faster.

And where density has become extreme, archetypal forms of dense matter, such as planets, come into being.

Focus/Radius (F/R) lines of force

These are so called because, according to the universal principle of *polarity*, a radiating *radius* line from centre to periphery can also be a focusing 'focus' line from periphery to centre.

They are created both (a) directly between the cosmic centre and its periphery, and (b) passing through sub-centre focal points on their way.

These F/R lines of force represent the path of least resistance between particular centres of the cosmic forces of *levity* and *gravity* as the two forces mutually tend to equilibrate.

This is what a 'conductor' of an electric current essentially is, ie a line of least resistance.

F/R lines also occur within each sub-sphere.

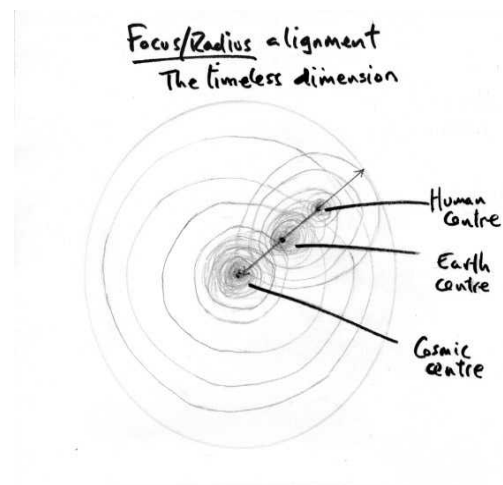
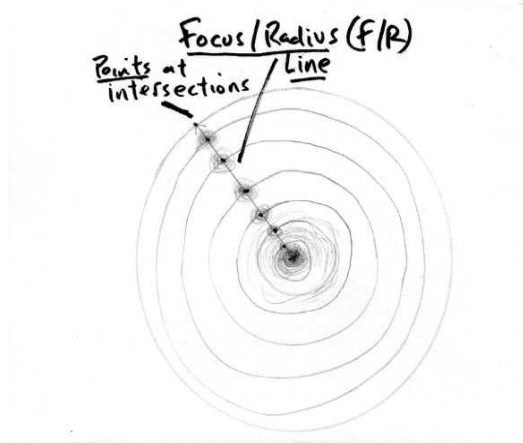
So, within this pre-physical cosmic environment, there is continuity in each F/R line, as it connects the *rarity* at the periphery with the *density* at the centre.

Once conceived, such a line of force instantly exists as an idea in consciousness.

And it's this timeless and physically spaceless D2D environment that provides a context and explanation of the otherwise 'counter-intuitive' Quantum concepts

of *nonlocality*, *superposition* and *entanglement*, which all apply regardless of physical distance.

F/R lines - straight or curved? In a spherical cosmos all extended lines are ultimately curved. So, whether they appear as straight or curved is determined by the scale of the subject matter under consideration which is being symbolically represented.



The Threshold

The **Threshold** is the border, the crossover zone, transition level, interface, portal etc between the pre-physical and the physical-material realms. It's where humanity exists and functions, held in suspension between the two realms of being.

Meanwhile, seen from the *Threshold*, it's clear that ultimately everything starts with and consists of consciousness in varying degrees of densification. And between all sub-spheres, ie units of consciousness, in the cosmos, there will be degrees of *resonance*, ie responding at different levels of consciousness.

Identity/Who I Am

The *Threshold* perspective thus brings awareness of the pre-physical **D2D** realm that's continuously being created by the dynamic interaction of *levity* and *gravity*.

And in that realm, that mode of consciousness,

I am simultaneously **individual I** and **universal I** (*universal consciousness*).

That is to say, I'm a radiating focal point, an individual unit, of *universal consciousness*.

Individual I – as a cosmic sub-sphere within which is formed this physical body – thus become a pulsating *sphere of influence*, in common with and interacting with other such focal points of consciousness.

Also, each centre point, which connects back to the cosmic centre via its own F/R line of force, is a portal into the 'inner' infinitude.

And this turns out to be one and the same as the 'outer infinitude', that is, the unquantifiable, ultimate *rarity* of *universal consciousness*, since *density* increases towards the centre and *rarity* increases towards the periphery.

The archetypal **torus** form, following this section, provides a useful 2D pictorial indicator of these pre-physical relationships.

So, the more deeply any focal centre point penetrates towards the cosmic centre, the more it will be compressed by gravity

and thus the smaller/narrower and loaded with more potential energy.

Conversely, the more expansive and powerful will be its sphere of influence.

Also, the smaller a spherical *resonant cavity* is, the faster its vibratory rate will be in *resonating*, ie responding to resonant stimuli,

Great Circle Planes (GCPs)

These are abstract constructs, useful for diagrammatically working out the relative positions and degrees of 'separation' between points in a spherical environment.

GCPs are circular, flat 2D planes, which pass through the centre point of a sphere.

In the diagram below, the *vertical, north/south* GCP, rotates on axis AB, while the *horizontal, east/west* GCP, perpendicular to AB, spins around the centre-point.

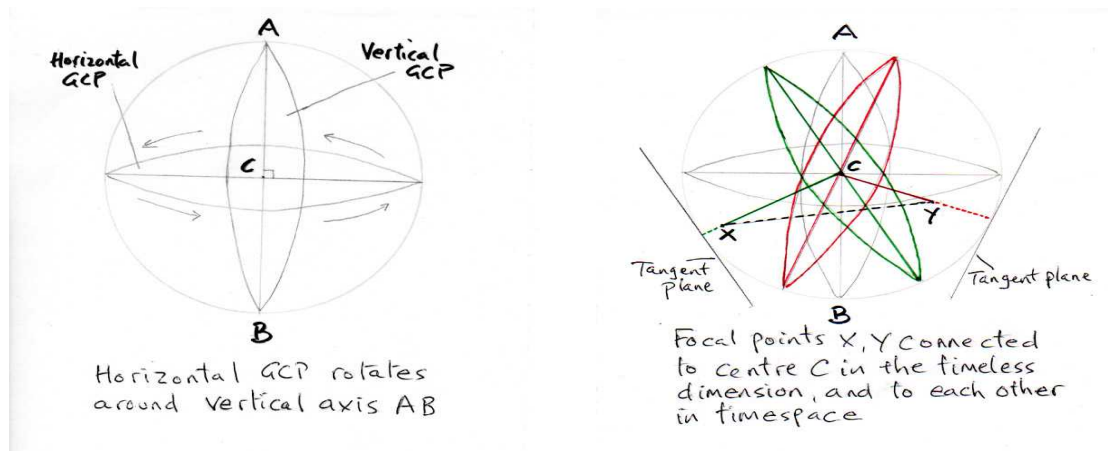
Any sphere has an infinite number of possible GCPs,

and each GCP has a corresponding parallel *tangent plane*

with which it is connected by a *focus/radius* (F/R) line perpendicular to both planes – the GCP at the centre and the tangent plane at the periphery.

Tangent Planes

are 2D planes touching a sphere at a point where a F/R line meets the sphere's circumference. A tangent plane and a GCP plane are perpendicular to their common F/R line and therefore parallel. So, GCPs and tangent planes together serve as coordinates for any spherical space or form.



Rotation/spin results from *levity* and *gravity* interacting in an asymmetrical environment of interacting forces.

Eg A tornado, the result of interacting airstreams, creates a narrow focal point close to the Earth which sucks up matter and disperses it from its higher, wider, open end. The 'zero centre point' eye of the storm, is where density is at its maximum.

Where a F/R line intersects a series of pre-physical, concentric sub-spheres/*resonant cavities*, the result is a range of tonal qualities that mark out an order of *primal values*. These can then be translated into the familiar sequence of *prime numbers*. (See *The Primal Code*) Robert Fludd's C17th cosmic monochord illustrates this broad principle in terms of harmonic resonance.

And on the scale of our human, pre-physical bodily form, those intersections mark out the series of subtle pre-physical energy vortices known in traditional Indian culture as the *chakras*.

Gauging/measuring the separation between points and between planes

The separation between points and between planes can be measured in terms of 2 kinds of 'angles', different in character from the angles of Euclidean geometry:

Between points:

The measurable 'angle' formed between F/R lines is where they converge/diverge at their shared centre point, eg the non-physical centre of the cosmos, the Earth or solar system.

Between flat planes:

This is the 'swivel' separation between intersecting planes,. When they are parallel, ie at equal angles of orientation to the cosmic coordinates, their 'separation' is zero, ie they are at an 'angle' of 0° or Infinity in relation to each other.

The discipline of *Projective Geometry* has recently been developed by NC Thomas. In this system, the separation of points is measured in degrees of *shift*, and the separation of planes is measured in degrees of *turn*.

Vortexes/vortices

A *vortex* is a dynamic phenomenon in the form of a narrowing/widening spiral, generated when levity and gravity interact in a fluid medium. In linear diagram form, a vortex resembles the spiralling rotational path traced out by a point shifting between the periphery and centre of a sphere – wider towards the *rarity* at the periphery, narrower towards the *density* at the centre. The point of a vortex is thus the centre point of the relevant sphere.

Terminology

Centricity is the degree of proximity of a point or sub-sphere to the centre of an enclosing sphere.

Periphericity describes the location of a pre-physical sub-sphere in relation to the periphery of a surrounding sphere or of the cosmos (inferred).

Absolute Centric Depth (ACD) would be the centre of the pre-physical cosmos, the point of maximum gravity, and the convergence point for all F/R lines of force.

Relative Centric Depth refers to how far any point in the cosmos is positioned along its F/R line towards the cosmic centre, relative to other such points on their F/R lines.

Absolute and **Relative Peripheric extent (or height)**, conversely, can likewise be defined.

The Code of Primal Values and Prime Numbers

Primal values relate to the series of sub-spheres that function as pre-physical *resonant cavities* and which resonate solely with the pulsating cosmos, ie the primal resonant cavity.

Primal values subsume and cancel out of existence any other potential resonant cavities that would vibrate at a rate resonant with and faster than their own.

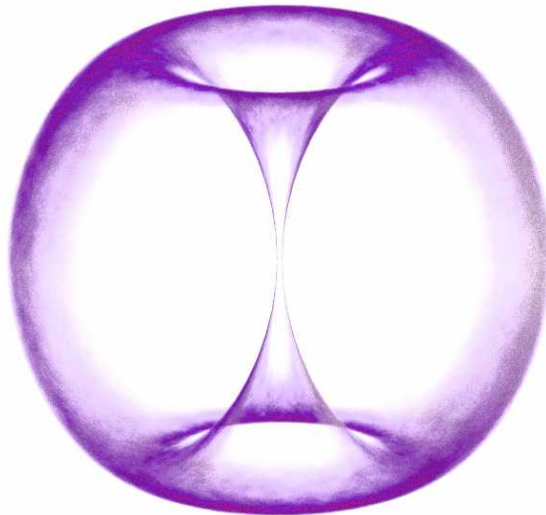
A crucial distinction is that *primal values* reflect real pre-physical phenomena to which correspond the **prime numbers** of the more familiar abstract, EMU number system, as is explained in **The Primal Code**, a free download from www.pathwayinitiatives.co.uk.

Threshold Wellness/Illness (a free download), shows how wellbeing, ease, unease, disease, balance, healing etc are parts of a coherent pattern, all dependent on **resonance** with the rhythms of nature and the pulsating cosmos.

A Mathematics of Subjective Qualities

does not have to be superficial, or mystical form of *numerology*.
For a start, there are the varying *qualities* of specific quantities,
as exemplified by '*Two's company, three's a crowd*'.

The Torus in D2D



From the *Threshold* perspective, the *torus* form represents a transitional phase/state between the pre-physical and physical-material states of being. It illustrates how, around a centre point, a focal point of universal consciousness, the the expansion/contraction dynamic between *levity* and *gravity* forms a transient pre-physical sphere of pulsating *energy*.

Within such a sphere, the pulsating energy creates a series of concentric spherical standing waves which form *resonant cavities*, self-ordered into a spectrum of tonal qualities, according to size and thus vibrational rate. In accordance with the universal principle of **polarity**, as *gravity* overpowers *levity* towards the central point of contraction, *density* increases and *rarity* proportionately decreases.

The two opposing forces, meanwhile, create a line of tension, the *axis* of the torus. And, assuming that the torus/sphere is not perfectly symmetrical, *spin* occurs, creating *vortices*. As inertia and density increase towards the centre, the axis becomes a passageway comprising two vortices, a *funnel-tunnel* linking the periphery, via two opposite *poles*, with the centre.

The periphery of the torus, its *outer* boundary, is an interface between *levity* and *gravity*, while the centre point is its *inward* interface/portal between the two forces which always tend towards a mutual state of equilibrium.

So, the inner central point functions as either:

- (a) the potential heart/centre of the embryonic form, or
- (b) the potential point of separation/division in the natural process of bifurcation.

And the central core/cavity expands to serve as a womb into which seeds are drawn – to be sheltered and nurtured as potentially new torus-beings.

Thus the physical forms of seeds and eggs, planets and individual creatures all derive from the archetypal embryonic *torus* form, which represents the transitional phase between the pre-physical and physical-material levels of being.

The axis represents the potential stem or spine of a living form, after the embryonic torus form has become materialised and shaped into its destined earthly form by levity and gravity, which jointly draw it away from and towards the centre of the Earth.

Meanwhile, the effects of *inertia* result in various archetypal forms of dense physical matter, such as the familiar spiral shapes of shells and cones.

The double vortex *funnel-tunnel*, which passes through the centre point of the torus-sphere, with its two orifices, is an *inner* continuation of the surrounding *outer* pre-physical cosmic space, itself a manifestation of universal consciousness.

The main body or volume of the *torus-sphere*, enclosed between its periphery and inner *funnel-tunnel*, represents the potential space-time, physical-material world of relative phenomena, forms and proportions.

Also, within the evolutionary process of division and bifurcation can be found the origins of the basic *male* and *female* forms, with their tendency towards reunion as part of the greater cosmic tendency towards an equilibrium state.

Thus the physical-material cosmos and all that it comprises are derivations of the pre-physical *torus*, an archetypal image which incorporates, in potential, the essentials of all living forms.

So, what use is this *Threshold/D2D Mathematics*? (Summary)

- It serves as a basic coherent and useful mathematical language of *consciousness* (universal and individual) for addressing psychological phenomena and events.
- It provides a way of thinking coherently about the non-physical, pre-physical realm of existence/being, and about the qualitative, non-quantifiable aspects of human experiencing.
- It treats these as real and valid areas for systematic mathematical consideration, in contrast to the conventional mathematics of the past – which has been essentially abstract and objective in its assumptions and approach to the 'problems' it has deemed worthy of addressing.
- It transcends binary 'either or' divisions such as subjective/objective, esoteric/exoteric, and the binary logic applied in digital thinking and technology.
- It liberates mathematical thinking into more imaginative and creative ways than is possible when locked into the current limiting rules, conventions and parameters. And that includes being tied to working unquestioningly with systems of EMUs (equal measure units), as if these are natural and inherent realities of the cosmos, when they are actually ingenious man-made mental devices.
- The liberating capacity of *Threshold* mathematics is demonstrated, for example, in:
 - (a) resolving centuries old mathematical enigmas including the *prime numbers sequence*, the *Riemann Hypothesis*, the *Goldbach Conjecture* and *Fermat's Last Conjecture* (not a theorem), and
 - (b) re-interpreting the so-called 'irrational numbers' into a coherent, rational system of *Threshold*

numbers, each of which addresses a different aspect of the mathematical relationships found between the physical-material and the pre-physical 'aspects of the *Threshold* where the two interface.

- It provides a way of resolving longstanding conundrums of materialistic science, such as how to reconcile *Relativity Theory* with *Quantum Theory* and the 'wave or particle' dilemma regarding light.

- It provides a sound basis for the long sought after 'grand unifying theory of everything'.

- So, in summary, *Threshold D2D* mathematics clears the path and thus opens up the way for new mathematical explorations into as yet unfamiliar regions of knowledge and understanding.

Time

Time is an idea/concept about one aspect of how humans experience their continuously changing state of being and environment. As such, it eludes any comprehensive understanding or description in the objective language of physical-materialistic science – which consequently has several different 'meanings' for the one word, 'time'.

1. **Duration:** (a) Subjective, experienced in a qualitative way...
(b) Objective, quantified and measured in EMUs...
2. **Moments:** Specific points along an imaginary 'time-line', marked out in EMUs according to clock and calendar systems with which humans artificially divide up the natural continuity of cosmic evolving. Because these are arithmetical subdivisions based on observed physical-spatial, planetary movements which the EMUs can never exactly fit, they are always approximations, although accurate enough for most practical human purposes. Thus leap years etc.
3. **Cycles** of events in this pulsating, vortexting, spinning cosmos themselves serve as measures. The periphery, centre-point and F/R lines of a sphere represent a *timeless* dimension, while time is experienced in the space between periphery and centre.
4. **Eternity:** endless, infinite, all-inclusive time (ie timeless)

Timelessness characterises: (a) the frictionless, resistance-free dimension of universal consciousness, and (b) the pre-physical cosmic central focal point, peripheral 'surface' and all F/R lines in between.

Timespace is the dimension between the cosmic periphery and centre in which human beings, as individual units of consciousness, experience a sense of time. This dimension exists prior to Einstein's concept of **spacetime** which implies the 3D physical realm with 'time' as the 4th dimension.

Lateral rotation of a sphere around its vertical AB axis renders the spinning horizontal great circle plane the basis for gauging the passing of cyclic time for that sphere.

Together all centre-points and their respective 'spheres of influence' constitute a network of instant timeless connectedness and communication at the aetheric level of being. Which helps explain the 'counter-intuitive' concepts in quantum physics known as *nonlocality*, *superposition* and *entanglement*, as well as such otherwise inexplicable phenomena as telepathy and homeopathic potency.

Thus what is 'central' in pre-physical timespace is not necessarily central in physical *spacetime*. For example, the functional control centre of a system may not be at its physical centre. This perspective also offers a clue to transcending the *heliocentric/geocentric* conundrum, viewing Earth as within the greater sun (solar system) . Similarly, the relative power of a sphere of influence generated from a particular centre-point in the cosmos will relate to its *timespace* centrality.

Primal values in timespace

Along any F/R line are marker points where the line intersects the circumferences of particular pre-physical sub-spheres/resonant cavities. Each marker represents a *primal value* of resonance which corresponds numerically to a *prime number*. These serve to subdivide the *timespace* of the cosmic sphere into a series of proportional 'levels', ie inward/outward degrees of *density/rarity*.

