UNIVERSAL THEORY

A MODEL FOR THE THEORY OF EVERYTHING

MOHSEN KERMANSHAHI

Universal Publishers
Boca Raton, Florida

Universal Theory:
A Model for the Theory of Everything

Universal Publishers
Boca Raton, Florida
2007 • USA

ISBN: 1-58112- 943-2
13-ISBN: 978-1-58112-943-4

www.universal-publishers.com

To my dear wife Firoozeh

And precious children

Sanaz, Sarvenaz and Sam

Table of Contents

Preface

"Where did I come from? Why did I come?
Will you tell me where my final destination will be?"
Jalaluddin Rumi 13th Century Persian poet

Who are we? Where are we? Why are we here?

Like everyone else entering the prime of their life, I have established a lifetime of success and failure, happiness and sorrow, moments of turmoil and times of order and routine. And although I had seldom a chance to pause and think about the meaning of life or the nature of the things around me, these issues have always preoccupied my thoughts. When the time came, this new era of my life brought the desire to find the answers to these questions that have preoccupied many before me, and will imminently occupy the minds of many to come. But then, where would I find the answers for these fundamental questions? Many people follow a spiritual path, but I decided to look for the answers in the domain of science.

We are in the dawn of the twenty first century where science has shown to have evolved a great deal, at least since I was in school about forty years ago. Puzzles like those we have encountered in Quantum Mechanics, new findings in cosmology, and research into the conscious mind take us to mysterious places and present domains previously unimaginable. There is a lot to learn and understand for someone like me who is in the pursuit of uncovering answers to fundamental questions. Have I been successful in finding answers? Not entirely, though factually, we may never know the whole truth, however there is no doubt that the more knowledge we attain, the deeper our insights into the true reality that awaits us. I can however, say with conviction that I have come a long way.

During the course of multidisciplinary studies, this concept formed in my mind a little at a time. This model was constructed through the over-viewing the different branches of human knowledge. What motivated me to pursue this idea further was that this developing vision in my mind could offer potential explanations for many of presently unresolved issues in science.

The more I studied, the more I felt that this concept could be a viable model. I strongly believe that the concept presented here can help us in attaining a more profound understanding of reality.

Over the course of the past five years, I have been developing this model step by step I have been especially encouraged by positive comments written by readers who have been visiting the web site where the concept has been posted, www.universaltheory.org. Some chapters of the book were also posted in a very wonderful website called TOE quest. This website -www.toequest.com- has been developed by Robert Armstrong and is devoted to discovering the Theory of Everything. This is a theory in which physicists from Einstein onwards have been exploring and is supposed to remove discrepancies between the two main branches of physics, Quantum Mechanics and Astrophysics. I am proud to have been chosen as the most favorite author on the TOE quest website, and also proud that my concept is consistent, coherent, fine tuned, and now at the stage of completion. This model offers an alternative for physical reality as we know it. If proved to be sound it could contribute greatly to human philosophy and will give insight to the reader for a more profound understanding of reality.

I have to thank Nahid Sahel Gozin who have written up the innovative mathematics for this model. Nahid is a physicist who has helped keep me from drifting astray during the course of writing this book. Many of the artistic drawings in this book were also prepared by Nahid. Without Nahid's tremendous support, this concept could not have been developed to this extent.

I would like to thank Eugenia Tang who has edited the pages and made this book readable and comprehensible. Above all, thanks to all the members of the scientific community, past and present, who have opened our eyes to new horizons and have made the universe a more understandable and malleable concept for the human race.

Introduction

"Imagination is entrusted with the responsibility to explore. Its mission is not to abjure reality but, rather, to magnify our inter-course with it. Karl Popper and Gaston Bachelard, among the others, have emphasized the historic importance of speculation in forming hypothesis and establishing scientific truth."

Etienne Klein

The pursuit to understand reality is a common quest. The human race has tried to understand the world and beyond since the beginning of its history. We have envisioned different scenarios over the years past. Have we come far enough? Certainly, we can be proud of our achievements. But amazingly, new and very interesting windows have been opened in front of our eyes. The new frontiers are very unfamiliar and not comprehensible to our traditional understanding.

Quantum super-position of states, the Heisenberg Uncertainty Principle, quantum entanglement, and other characteristics of the sub-atomic arena have introduced an in-deterministic interpretation of reality. This has left objective physicists uneasy. Numerous attempts, such as Bell's Theorem, have failed to extend the rules and logic of familiar classical physics to the subatomic domain.

New puzzles also come about in Astrophysics. Black holes, dark matter, non-zero cosmological constant and dark energy, etc. has complicated the scheme even further.

The scientific method of psychological assessment has also unveiled a new understanding of the mind and consciousness. Many experiments support notions like Holonomic Brain theory (non-locality of consciousness) and transpersonal psychology (a universal Psyche).
Certainly, solving the above puzzles is the un-chanted road ahead. How can we go about doing so. The unexplained has left the science as an open system. Efforts have been directed at finding explanations for such strange phenomena in the last century with traditional scientific method of thoughts but to no avail. At this

point it seems that we have to alter our vision and logic in order to interpret new findings. A new vision will help us interpret the unexplained, so that we can return to a scientifically closed system. To this end, I believe, we have to extend the observable arena and introduce definitions for zeros and infinities. Unfortunately so far mainstream physics and the dominant theoretical physical theories have chosen to avoid these two fundamental elements.

This model is in line with Einstein's view, which presumes the presence of reality out there beyond our consciousness and incorporates Neil Bohr's view because it has a mind component.

Aims

In this book, I am presenting a concept, which can reintroduce objectivity as a tool to explore reality. I believe this model has the potential to bring us back to a deterministic world.

Together we will revisit the origin of the universe with a new vision. We will explore whether this new perspective is capable of offering answers for different astrophysical, quantum mechanical and psychological paradoxes.

The effort to locate an explanation for the unexplained falls into the long sought after the Theory of Everything, which aims to solve the inconsistencies between Einstein's General Relativity and quantum mechanics (the study of subatomic particles). Despite endless efforts made by great physicists, Einstein's quest for a Theory of Everything still remains obscure. I describe one of the problems at this time as an example;

In General Relativity, space is presented has a smooth curve produced by the existing masses in it. This is in line with our everyday experience. As we go to smaller scales the smoothness continues till we reach ultra small or Planck scale ($1.6*10^{-33}$ cm). In the vicinity of this scale the fabric of space starts to get very rough and cranky. Gravity cannot explain the violence, which exists in fabric of space in ultra small scale. Interestingly, the violence exists even without an actual particle being present.

In Planck scale quantum mechanics prevail. The roughness of the fabric of space in ultra short scale is explained by quantum mechanics. However, the explanation about the shape of the space is not compatible in these two theories. The Theory of Everything

is supposed to remove discrepancies and enclose the concepts of quantum mechanics and general relativity in one grand theory.

Ideas presented in this book aim at being a model for the theory of everything.

Avoidance

General Relativity precisely describes the motion of stars and galaxies as well as everyday events that we encounter in our lives. Quantum Mechanics on the other hand, accurately predicts and describes subatomic particle reactions and the world that exists in small scale. Ideally, they would have to work hand in hand to account for the entire universe as a whole. Unfortunately, we have not been able to find a feasible relationship between these two major domains of physics. In fact, they are currently considered incompatible. If we use the mathematics of general relativity and quantum mechanics together, the answer is usually *infinity*. Since infinity cannot exist in our present model of the universe, these calculations are discarded and incompatibility is declared.

It seems to me that we have consciously decided to avoid paying heed to road signs that are erected in every step of the way. This is all done by clinging to objectivity (Tangibility). The problem is that we are using traditional judgment and logic to define this objectivity. Existing theories constantly circumvent singularities and infinities that regularly present themselves in experiments and calculations.

During 15th Century mathematicians frequently found that positive numbers could not explain all of the functions that existed in the mathematical field. They realized that they had to expand the field to include a new domain. This domain would be different than the one that they had been acquainted with, so they extended the field to accommodate negative numbers. By doing so, many unexplained calculations could then be accounted for and subsequently understood.

Then once again, when faced with the square root of negative numbers ($\sqrt{-n}$), mathematicians realized that their understanding of math is not complete. So they added yet another arena. They opened themselves to the concept of the so-called imaginary numbers, although the concept was still mysterious and obscure at the time.

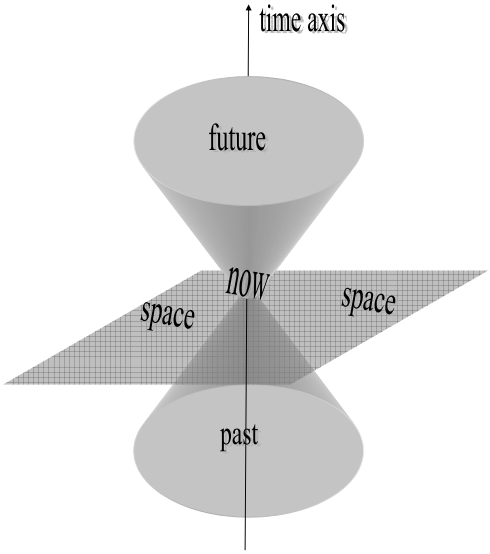
In the field of Physics, we have been unwilling to explore and adapt to the unknown arena. We have built many ideas and models but all of them are within a kind of space-time field. Despite the fact that known physics tells us that space, time and matter are not absolute and that most paradoxes arise when we get close to the boundaries of space-time, we are still afraid of going over the cliff.

Subconsciously we aim to construct theories that avoid delving into a field beyond that of the familiar, space-time.

The majority of attempts to find explanations for the unexplained, such as the super string and M theories, loop quantum gravity, etc. have been constructed within framework of this "known" arena.

Since our objective space-time knowledge deals with computable objects, the physical meaning of zero is not defined in our tangible world. In addition, because quantity in space-time is numbered and ultimately finite, we can not define infinities either. Thus in theoretical physics, we regularly eliminate and ignore them and as we call it (normalize them) in our equations.

A sure signal of direction is the fact that calculus has been the mathematics of choice to explain the fundamentals of theoretical physics. Differential calculus, derivatives, tangents, limits of sequence, zeno problems, and light cones all point to"zero". Instead of avoiding it we had better open our eyes and take a closer look at point zero and the fundamental role it plays in our physical world.



Light Cone

Many mechanisms have been adopted to bypass zeros and infinities. Even Schrodinger's equation, which helps us to understand and calculate quantum mechanical functions, has been formulated to help cliff settlers remain on their safe spot (familiar space-time) and continue their calculations in a safe and familiar environment. Theoretical physicists call these run away mechanisms "normalization". We hesitate to go over the edge of the cliff because we believe that, we are not capable of examination or measuring or even comprehend singularities or infinities. But read on and see if this kind of reasoning is in fact realistic.

All this is happening despite the fact that we have the appropriate tools to explore zeros and the non-computable. Imaginary numbers were introduced in the 16th century. The nature of complex numbers (a combination of real and imaginary numbers) was gradually constructed and today we have reached a point where we have a much clearer understanding of this system. As a matter of fact complex numbers are now a fundamental part of mathematics and physics at a deeper level. The complex number system can guide us to define zero and infinities in the physical world. That is if we open our scope and imagine a

physics that surpasses and goes beyond our space–time. The model presented in this book is based on an enclosed space-time.

Gordon Kane from university of Michigan in Ann Arbor believes:

> "As we go to smaller distances or higher energies, we expect each effective theory to need re-normalization this is not a problem or an unexpected failure of the theory. However, the primary theory (*Theory of everything*) had better not need such inputs or re-normalization." [50]

It is understandable if a midway theory, which is not able to go deep enough, requires re-normalization in order to present its mandate. However, as Gordon Kane states, the ultimate theory cannot ignore any portion of evidence and would have to explain every aspect of reality. Regrettably, he further argues: "It has to be a finite theory (One that never gives an infinite prediction for a physical quantity)."

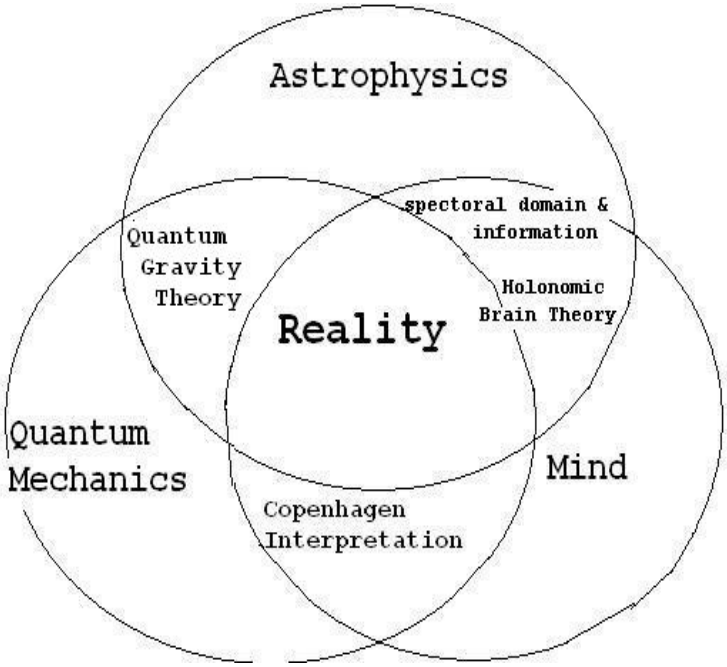
If mathematics is the infrastructure and blue print for physical theories and zero and infinity are indispensable portions of mathematics, then we have to open our mind to the possibility that the ultimate theory may not be a finite theory and therefore may very well contain zeros and infinities.

Through the act of re-normalization, we have left physics as an open system. An open system by nature cannot contain and conclude the whole function. This kind of approach has left a good portion of reality out of our reach and understanding.

Not only have we not paid heed to the clearly visible road signs, but we have also attempted to cover them up. Theories like Super Gravity, Super Symmetry, Super String and the like, are introduced primarily to cancel out zeros and infinities. Maybe this is the main problem; it is dragging the energy and capacities of the mainstream physics community off track.

At the same time, a theory that can only solve the conflicts between two major components of today's physics, namely General Relativity and Quantum Mechanics, cannot be considered as The Theory of Everything. To be able to claim universality, such a theory must also explain the emergence of life and the mystery of mind. The old dilemma between consciousness being a separate entity or the product of the brain has reached new horizons.

Next I will start this venture by offering a fundamental theory utilizing intuitions derived from space-time knowledge. With the belief that cause and effect are a part of one system and by looking beyond the known realm, we should be able to collect evidence which guides us to a deeper understanding of reality. I intend to show that the space-time universe, the quantum world, and the mind are the tripod of reality. In order to achieve this deeper understanding of reality, we must study the above topics. I believe this to be the main challenge put forth for the human race in 21st century and beyond.



Reality Tripod

The above fields (even with our present knowledge) are derived, joined and united in a kind of singularity; a singularity with a definition different from that which is traditionally accepted. Singularity by the traditional definition is the ultra dense zero size point which is the initial nucleolus of our universe and the origin of the Big Bang.

Roger Penrose states:

> "This new theory (theory of everything) will not just be a modification of quantum mechanics, but something as different from standard Quantum Mechanics as General Relativity is different from Newtonian gravity. It would have to be something, which has a completely different conceptual framework. In this picture, quantum non-locality would be built in the theory"[5]

Although we will make use of mathematical concept as often as we can, do not expect that this model be a traditional physical model, based on and derived primarily from a Lagrangian mathematical structure. One main reason for this is that the Platonic mathematical world does not match the physical world in its entirety. Roger Penrose looks at the Platonic Mathematical world as a perfect and separate entity. He believes our physical world is utilizing just a portion of that perfect world. [56]

An ideal sphere found in geometry

Maybe we can relate the difference between these two separate worlds to the fact that there are many more factors shaping the physical world as compared to the mathematical world. For example let us compare a geometrical sphere to a similar physical body like a planet.

An actual spherical object in space-time

The only determining factor of a sphere in geometry is its radius. But many elements are affecting the shape of a physical object like a planet. The gravity gives the mass of a planet a spherical shape whereas its spinning tends to somewhat flatten the poles of our otherwise perfect sphere. In addition, the mass constituents and grain in conjunction with geological and atmospheric activities change the interiors and surface texture of the planet. So a planet ends up being far from a perfect sphere. The planet is also alive. I mean like any other real object it has an imaginary (i) dimension. So in the physical world, not only are there many factors at work but according to the fundamental concept of complex numbers, objects have an imaginary dimension as well. Maybe that is why the physical arena is different from the precise and idealistic platonic mathematical world.

Therefore, I conclude that a less complicated mathematical construct cannot precisely represent the multi-factorial and complex physical domain. For all practical purposes, one can assume that the valid portion of mathematics is the portion that is consistent with the structure of the physical world. But there is a fine line in here. Often mathematical propositions guided the physicist to new discoveries. At the same time one should be cautious of capitalizing on complicated mathematical constructs

that pulling us farther away from tangible physical world. Many times this kind of mathematics can be non-physical. May be this is what is happening to the leading candidate for the Theory of everything, the Super String Theory. Many of its components, which are based on mathematical propositions, are not observed.

Occasional use of math equations in this book should not be a deterrent to readers who are not as proficient in mathematics. At the end of each mathematical proposition there is an assertion written in plain English so the reader can follow through the discussion with ease.

I would like to clarify that this model is not a reductionists attempt to explain reality from the bottom up. And although I utilize experiments and evidence to substantiate the principles of this theory, at the present it is not a theory of physics, because the Lagrangian has not yet been written for it. However, it is consistent and coherent. I have tried to adhere with scientific methods in my study. This is a new speculation from a new axiom and I hope it proves itself helpful in explaining the unexplained.

The following model attempts to answer a wide range of mysteries, which are facing us today. Hereinafter I call it the Universal Model.

While we have tried not to stray from current knowledge, some of the ideas presented may not be completely agreed upon by mainstream scientists. Although the introduction of new ideas is the way for science to evolve the reader is cautioned to use his or her own judgment before adopting any of the presented concepts.

Complex Numbers

Co-written with Nahid Sahel Gozin

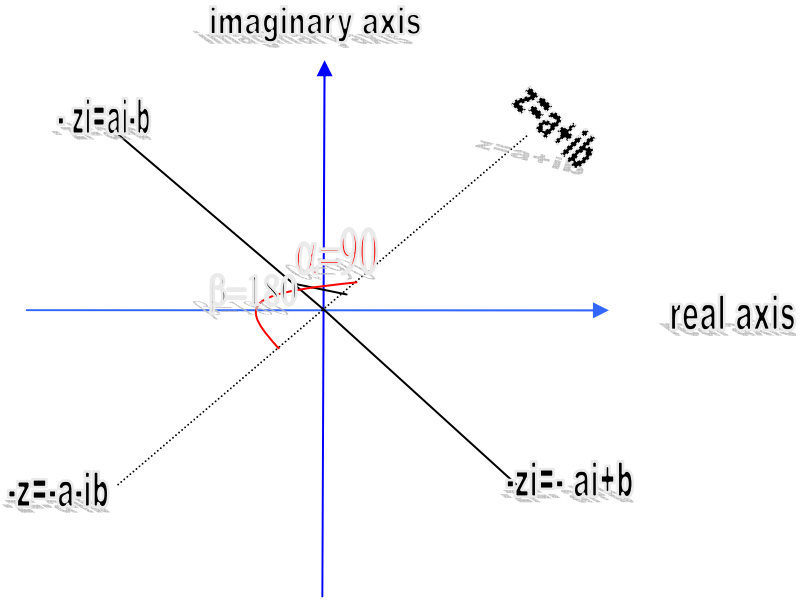
Contemporary physics has been developed over the centuries and has been quite effective as a base for science and technology. But many puzzles and paradoxes exist in quantum mechanics (the sub-atomic arena) and astrophysics which cannot be solved in the context of the current physics domain. Consciousness also remains a mystery. In fact, the findings of the past century defy the principles of contemporary physics. New revelations have painted a more detailed universe and resent an alternative reality that we cannot explain with the traditional axiom. An alternative physics is needed to explain the newfound reality. That is why new fundamental theories are being introduced to explain the unexplained.

In this book, I will present an alternative physical model for the universe and offer explanations for existing paradoxes based on this new concept. In this model, the space-time universe is

embedded in a newly defined singularity. In order to better follow this model, familiarity with the concept of complex numbers is helpful. I will try to explain the concept in layman's terms for the reader who is not keen in mathematics. Alternatively, the reader may choose to skip the math equations and just look over the assertions made on their basis. Doing so will not prevent comprehension of the concept.

First, I am going to explain the basic principle of complex numbers. Our physical interpretation of different elements in complex number mathematics will be followed in this chapter and ensuing chapters as needed. The interpretations and assertions made do not necessarily apply or accepted in contemporary physics. The analysis is derived and defined on the context of a new model.

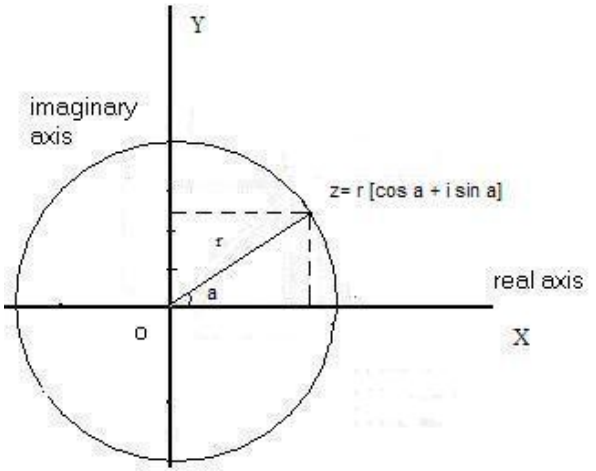
Complex number system can be defined as a Cartesian system where the x-axis represents the real value and the y-axis denotes the imaginary part.



Modified Complex Plane

The second and third quarter of the above diagram is not defined in the current complex number system.

Underneath, the polar system version is shown where r = |z|, called the absolute value or modulus, and a = arg(z), called the complex argument of z.



Periodic nature of Complex numbers

The equations for the diagram above can be written as:

$Z = x + iy = r(\cos a + i \sin a)$

$x = r \cos a$, is called the real part

$iy = ir \sin a$ is called the imaginary part.

Does it sound like gibberish? It simply says that complex numbers are a combination of purely real and purely imaginary numbers.

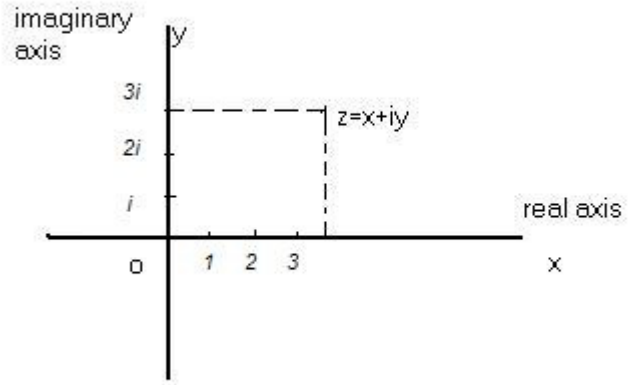
Imaginary Numbers

What are imaginary numbers? In the sixteenth century, Italian mathematicians frequently encountered the square root of negative numbers ($\sqrt{-n}$) in their calculations. Known mathematics could not offer a solution for this problem because nothing could be squared to -1. Eventually, an imagined number was chosen. The square of this imaginary number would be -1. This number was called imaginary number and is represented by the symbol *i*. Later on, it was noticed that a combination of real number and imaginary number is essential to explain the fundamentals of

mathematics. This combination is called the complex number system.

Complex number = [x (real number) + *i*y (imaginary portion)]

In 1806, Jean-Robert Argand, trying to give geometrical visualization to complex numbers suggested the diagram below:



Argand Diagram

In 1799, Gauss proved the fundamental theorem of algebra using complex numbers. Nowadays, the use of complex numbers pervades a major portion of mathematics and its applications in science. Even pure real numbers are rightfully reintroduced as:

N = x + 0i

Where N denotes a number, x is the real value and i conveys the imaginary aspect of it.

This configuration demonstrates the imaginary dimension embedded in any real number.

Please, do not be disappointed if the definitions presented in this chapter do not exactly match the conventional definitions for the complex number system. The descriptions and assumptions

made in this chapter are defined within the context of the proposed model in this book. As long as the assertions are mathematically sound, we should be able to rely on them and refer to them in future quotations.

One would assume if imaginary numbers are so fundamental in mathematics, they would have to represent a physical reality. As Roger Penrose points out,

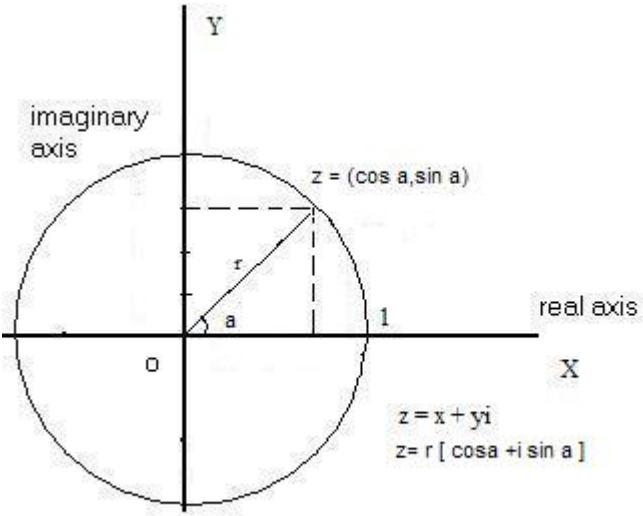
> "These strange numbers also play an extraordinary and very basic role in the operation of the physical universe at its tiniest scales." [56]

In this context, I take the real numbers to represent observables and interpret imaginary numbers as non-observables and qualitative values of physical elements. As mentioned, we measure the elements of space-time by real numbers. The notion of complex numbers implies that any of these elements should have an imaginary dimension in their nature. In other words:

Assertion C1: Any computable in the universe also contains a qualitative non-measurable aspect embedded in it.

Therefore, I conclude that at a profound level, just dealing with objective reality is not enough. To get the whole picture we have to open our scope to include non-observable aspect of physical elements as well.

In 1707, Abraham De Moivre found a similarity between complex numbers and trigonometry. These numbers follow the same rules applied to trigonometric calculations. For example, when we square a complex number we double its phase (angle).



Resemblance of Argand Diagram and Trigonometry

$Z^2=r[\cos \alpha+i\sin \alpha]\times r[\cos \alpha+i\sin \alpha]$

$Z^2= r^2[\cos^2\alpha-\sin^2\alpha+2i\cos \alpha\sin \alpha]$

$Z^2= r^2 [(\cos 2\alpha+1)/2 +i \sin 2\alpha]$

Here, Z^2 is a complex number. $[r^2 [(\cos 2\alpha+1)/2]$ is its real part and $(\sin 2\alpha)$ is its imaginary part.

In this text, we take point zero in the Argand diagram to represent singularity and the imaginary portion of the diagram as the effect of the proposed singularity on the observables.

Imaginary numbers are sometimes called magic numbers. One of the strange characteristics of these numbers is the fact that in De Moivre diagram, any real number coupled with (multiplied by) them will be reduced to zero.