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The Theory of Everything

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Abstract

A few decades ago, several brainwashed physicists and mathematicians claimed to have discovered the Theory of Everything, supposedly composed of Schrödinger's equation combined with Einstein's theories of relativity.

At the time, smart people almost laughed at the combination of several elements of the Theory of Everything, when it should be a single thing or a single law.

Second, how can two incomplete and misleading laws, such as Einstein's relativity and Schrödinger's quantum mechanics, be combined to form a complete or perfect theory?

On the other hand, if we could collect and synthesize all the well-established laws of universal physics into a single sentence, this would constitute the long-sought Theory of Everything, the subject of this article (equation 4).

Through this paper, we support the theory that Equation 4 is the theory of everything and further provide 7 different applications from several fields of classical and quantum physics, mathematics, probability and statistics, etc. to prove that the proposed Equation 5 is the only theory of everything.

Today, claims by deluded scientists that Schrödinger's equation is combined with Einstein's theories of relativity are still circulating and

spreading, but as a joke, since the true theory of everything (Equation 5) has been discovered, presented, explained and successfully applied over the past five years under the name "Cairo Statistical Techniques.

The question arises as how a single equation can solve all fields of physics and mathematics.

The secret lies in the preselection of the input elements of the main diagonal RO of transition matrix derived from the statistical theory of Cairo techniques.

Surprisingly, any physical or mathematical situation corresponds to a presupposed value of input elements of the main diagonal RO of the transition matrix B, derived from the statistical theory of Cairo techniques. This means that the appropriate choice of the input diagonal element is the key solution for Cairo techniques using chains of transition matrices B.

In this article, we show how Cairo statistical techniques can solve several illustrative applications in almost all areas of physics and mathematics, including:

1- Laplace and Poisson PDEs.

2- Solution of the classical heat diffusion and conduction problem in its most general form.

3- Derive famous statistical laws such as the Gaussian or normal distribution law.

4- Solve problems with the Schrödinger equation of quantum mechanics in 1D, 2D, and 3D.

5- Derivation and explanation of Einstein's theories of special and general relativity, more accurate and more complete than those of Einstein in 1915.

6- How the Big Bang Formation and Explosion Occurred Millions of Years Ago

..etc.

But the above-mentioned bad joke continues to be spread every month or week by big names like NASA, FERMI, CNRS, etc., deceiving and misleading our young generation.

We demand that they do something useful, or simply stop.

I.INTRODUCTION

The premise of this article is simple and straightforward:

True physics and mathematics derive exclusively from the universal laws of nature. These laws constitute and generate the foundations of mathematics, physics, chemistry, geometry, and all the sciences we know.

However, there are certain rules to which these universal laws are subject:

*Rule 1: The universal laws of physics are unprovable and cannot be deduced or proven mathematically.

Anyone who mistakenly attempts to mathematically prove one or more universal laws of physics is practicing black magic, not science.

It should be noted that the great A. Einstein fell into this trap when he attempted to deduce the universal law of the Lorentz transformation in 1D and 3D through thought experiments, calling them the theories of special and general relativity, which is nothing more than low-grade black magic.

Rule 2*: Mother Nature operates in a unitary 4D xyzt space where time t is integrated over the three axes of geometric space as a dimensionless number N.

We believe that all classical and quantum physics, or even any mathematical formula operating in classical D^4 space (3D geometry with real-time as the external controller), is incomplete and misleading.

Rule 3*: Rule 3 implies that **time t cannot be expressed as a scalar quantity consisting of a scalar number t seconds, but must be expressed in four components: the vector quantity tx, ty, tz, tt.**

Rule 4: The nature of the solution properties of any subject, whether classical physics, quantum physics, relativity, mathematics, etc., follows from the nature of the input elements of the main diagonal RO ∈ [0,1] or Rii∈ [0,1] as shown in Figures 1,2.

Fortunately, the universal physical law governing Einstein's special theory and the theory of general relativity in 1905 and 1915 is the famous Lorentz transformation law in one geometric dimension (x-t) and three geometric dimensions (x, y, z, t), respectively. It is therefore easy to get started and find a rigorous explanation and proof of this important modern theory of relativity in less than a page.

Only when the curvature of spacetime is significant, as in the case caused by the gravitational field near the Sun or any heavier star, should physical quantities be expressed as tensors; otherwise, a scalar or vector description would suffice.

This is similar to the case of special relativity where it applies its relativistic quantities only when the object's speed v is sufficiently high compared to the speed of light C, otherwise the classical non-relativistic description would suffice.

Examples of choices of the input elements of the main diagonal RO ∈ [0,1] or Rii ∈ [0,1], are as follows:

i-Ri=0 corresponds to classical physics such as Laplace and Poisson PDEs with Dirichlet boundary conditions vector **b** and a source/sink term vector **S**.

ii- Rii=zero GT constant corresponds to classical physics such as heat diffusion in metals (Rii=0.22 for aluminum and 0.2 for low carbon steel) with a Dirichlet boundary condition vector **b** and a source/sink term vector **S**.

iii-Ri=0 in an infinite vacuum with zero-fall conditions (b=0 and S=0) corresponds to the proposed modern theory of general relativity.

iv-Ri=0 in an infinite vacuum with zero fall conditions (b=0 and S=0) with sawtooth-shaped Rii in the geometric coordinates x, y, z corresponds to the quantum mechanical system of particles or system of energy densities.

The above cases i-iv are illustrated in Figures 1 Section II .

In order not to worry too much about the details of the introduction let us move directly to Section II, the theory.

II. theory.

The superiority of the transition matrix B over the Markov transition matrix M is evident: the matrix B leaves room for the boundary condition vector b and the source term vector S, unlike the Markov matrix.

Another important note: the Heisenberg transition matrix is neither transitional nor statistical.

The essential prerequisites for studying the transition matrix technique B and the Cairo techniques as a whole are:

1- mastery of matrix operations and calculations [1,2,3].

2- mastery of algorithms and programming languages such as C++ and Fortran [1,2,3,5].

3- a thorough knowledge and understanding of the universal laws of physics [4,5,6].

Let us recall that in the case of building new foundations of quantum mechanics, the breakthrough occurred when the author of this article proposed to replace the Schrödinger PDE describing the complex wave function Ψ with the square of the Schrödinger PDE describing Ψ^2= Ψ . Ψ*, which is essentially real and represents the distribution of the quantum energy density U(x,y,z,t) in a closed control volume bounded by a closed area subject to Dirichlet boundary conditions [5,6,7]. Ψ^2 = Ψ . Ψ* in a 4-dimensional x-t unit space, necessary to express the quantum energy density flux (U(x,y,z,t) = Ψ^2 (x,y,z,t)). Therefore, we propose a new Schrödinger equation for Ψ^2, which should take the form of an energy density diffusion PDE, like that of thermal conduction. This new equation for Ψ^2 should be completed by the advanced artificial intelligence proposed by the author [8,9].

It should also be noted that the numerical statistical theory called Cairo techniques belongs to Hamiltonian statistical matrix mechanics.

Fortunately, it is the square of the Schrödinger PDE, and not the Schrödinger PDE itself, that belongs to the matrix mechanics of the Cairo techniques, reducing the solution of the quantum problem to matrix calculations assisted by the advanced artificial intelligence proposed by the author.

Nowadays, physical and quantum matrix mechanics are gradually returning to the forefront of research in a robust and consistent manner thanks to the series of matrix mechanics B, at the expense of partial differential equations, which constitutes a logical and natural reform [10,11].

The need to define and describe an energy density matrix B as well as a space-time curvature matrix C in the unit spacetime xyzt is evident. In this paper, we call the energy density field U(x,u,z,t) and the corresponding curvature field C(x,y,z,t), where both fields are clearly second-order tensors or matrix fields.

For example Cxy = is equal to dxdy)partial / Ux Uy, Cyz = dydz)partial / Uy Uz, Cyt = dydt)partial / Uy Ut .. etc.

∇2xx ∇2xy ∇2xz ∇2xt [U(x,y,z,t)

∇2yx ∇2yy ∇2yz ∇2yt [U(x,y,z,t)

∇2zx ∇2zy ∇2zz ∇ zt [U(x,y,z,t)

∇2tx ∇2ty ∇ 2tz ∇2tt [U(x,y,z,t)

We call this constraint matrix Matrix 1

On the other hand, the curvature matrix/tensor of spacetime is given by:

Cxy Cxy Cxz Cxt

Cyx Cyy Cyz Cyt

Czx Czy Czz Czt

Ctx Cty Ctz Ctt

We call this curvature matrix Matrix 2

Rule 3* We reaffirm that the little-known and rarely mentioned Lorentz transformation law in 4 dimensions x, y, z, t is a universal law of physics and implies that the unitary space xyzt is conserved for the system in the control volume under consideration.

The Lorentz transformation law implies that:

Matrix 1 * Matrix 2 = I . .(1)

Where I is the unitary matrix.

Equation 1 is the proposed modern general relativity that is intended to replace Einstein's general relativity,

G μ ν (nu)= 8 Pi G / C^4 . T μ ν . . . (2)

The author claims that the modern stress-strain tensor of equation 1 is more complete than that of Einstein 1n1915, equation 2.

It is clear that ∇^2 ij U is the force tensor element Fij at the required point (∇^2 ij U = Fij).

An important objective of this paper is to compare the theory and practice of equations 1 and 2, i.e., Einstein's classical general relativity in 1915 and the modern general relativity proposed in 2022.

Finally, it should be noted that **special relativity is only a subset of general relativity and can be derived from it.**

The above discussion shows that there are currently two distinct theories of general relativity: the first is that of A. Einstein in 1915, and the second is the one proposed by the author in 2022, derived from the statistical theory of Cairo techniques.

In this article, we compare the two theories in detail to better explain their foundations and understand them better..

Note that

It's worth noting that the Theory of Everything is not a fanciful hypothesis, but rather a comprehensive theoretical and practical framework in physics that aims to connect all the fundamental laws of classical physics, quantum physics, mathematics, probability, and statistics into a single, coherent system. The primary goal is to unify fundamental laws or theories, such as gravity, electromagnetism, and the theories of special and general relativity.

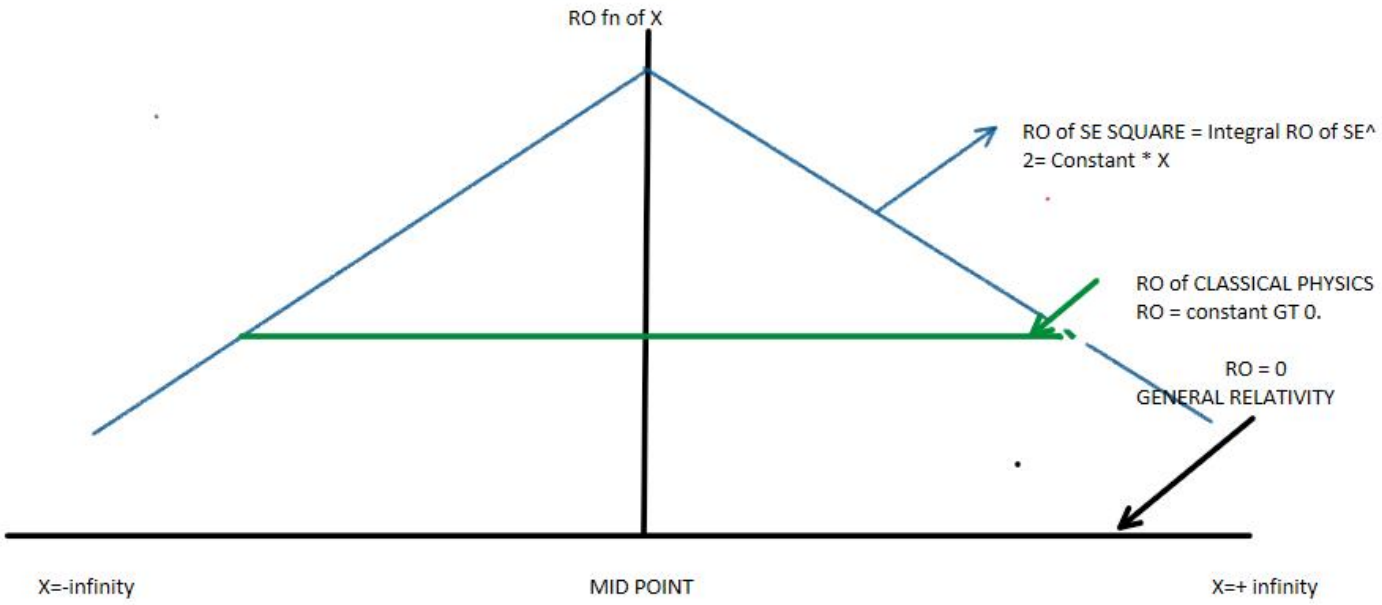


Fig.1. shows Rii in the shape of a sawtooth in the geometric coordinates x [1D].

[Rii in the shape of a sawtooth in the geometric coordinates x, y, x].[2D]

express the quantum energy density flux (U(x,y,z,t) = Ψ^2 (x,y,z,t)).Therefore, we propose a new Schrödinger equation for Ψ^2, whichshould take the form of an energy density diffusion PDE, like that ofheat conduction. This new equation for Ψ^2 should becomplemented by the advanced artificial intelligence proposed bythe author [8,9].The numerical statistical theory called Cairo techniques isfundamentally Hamiltonian statistical matrix mechanics.Fortunately, it is the square of the Schrödinger PDE and not theSchrödinger PDE itself that belongs to the matrix mechanics of Cairotechniques reducing the solution of the quantum problem to matrixcalculations aided by the advanced artificial intelligence proposed bythe author.Nowadays, physical and quantum matrix mechanics are graduallycoming back to the forefront of action in

a strong and coherent wayvia B-matrix mechanics chains rather than classical PDEs, which is alogical and natural reform[7,8,9].

For example, Cxy is the xy spacetime curvature of the energy density U(x,u,z,t) at the required xy point, and Cyt is the yt curvature, etc.

Note that Cxy is equal to d^2 U/dxdy)partial, etc.

Rule 3* We reaffirm that the little-known and rarely mentioned Lorentz transformation law in 4 dimensions x, y, z, t is a universal law of physics and implies that the unitary space xyzt is conserved for the system in the control volume under consideration.

We call the curvature matrix M2.

In other words,

Matrix 1 * Matrix 2 = I . .(1)

Where I is the unitary matrix.

Now, equation 1 is the proposed modern general relativity that should replace the Einstein general relativity.

G μ ν (nu)= 8 Pi G / C^4 . T μ ν . . . (2)

It is clear that M1 is the stress matrix/tensor defined by ∇^2 ij U at the required point which is Fij per unit normal area.

An important objective of this article is to compare the theory and practice of equations 1 and 2, i.e., Einstein's classical general relativity and the proposed modern general relativity.

Finally, it should be noted that special relativity is only a subset of general relativity and can be derived from it.

In a previous article we showed that currently we have two distinct theories of general relativity, the first is that of A. Einstein in 1915 and the second is that proposed by the author in 2025 as derived from the statistical theory of Cairo techniques. In this article, we compare the

two theories in detail to better explain the basis of each and provide a better understanding of both.

However, the current research framework for the Theory of Everything is a real and comprehensive theory, as it aims to describe the universe at its most fundamental level, potentially linking mathematics, quantum mechanics and general relativity, electromagnetic field theory, etc.

The multiple pillars or fundamental laws that govern the physics of the universe are the theory of relativity and that of quantum mechanics in addition to partial differential equations, differentiation and integration, probabilities and statistics... etc.

The reason is simple: physics derives solely from the universal laws of nature. These laws constitute and generate the foundations of mathematics, physics, chemistry, geometry, and all the sciences we know in the form of partial differential equations or otherwise.

This means that if we could gather and collate all the laws of universal physics into a single sentence, that single sentence would be the theory of everything that is the subject of this article.

However, there are certain rules to which these universal laws are subject:

Rule 1: The universal laws of physics are unprovable and cannot be deduced or proven mathematically.

Anyone who mistakenly attempts to mathematically prove one or more universal laws of physics is practicing black magic, not science.

Note that the great A. Einstein fell into this trap when he attempted to derive the universal law of the Lorentz transformation in 1D and 3D through his thought experiments, calling them special and general relativity, which is nothing more than low-grade black magic. Now let's return to general relativity:

Rule 2: Mother Nature works in a 4D unitary space xyzt where time t is woven into the three axes of geometric space as a dimensionless number N.

We believe that any classical/quantum physics or even mathematical formula operating in D^4 space (3D geometry with real-time as an external controller) is incomplete and misleading.

Rule 3: Rule 1 implies that time t cannot be expressed as a scalar quantity consisting of a scalar number t seconds but must be expressed in four components: the vector quantity tx,ty,tz,tt.

Rule 4: The rules 1,2 implies that all physical quantities should be expressed in matrix or tensor form like the case of general relativity.

Fortunately rule 3 is linked to the quantity of spacetime curvature like the case of Einstein general relativity of 1915.

Only when the curvature of spacetime is significant, as in the case caused by the gravitational field near the Sun or any heavier star, should physical quantities be expressed in tensors, otherwise the scalar or vector description would suffice.

This is similar to the case of special relativity where it applies its relativistic quantities only when the object's speed v is sufficiently high compared to the speed of light C, otherwise the classical non-relativistic description would suffice.

To avoid going into the details of the theory, let's skip directly to Section III: Applications and Numerical Results.To avoid going into the details of the theory, let's skip directly to Section III: Applications and Numerical Results.

III-Applications and Numerical Results

In this section, we explain the theory and applications of every thing in more detail through the question and answer technique covering a wide range of areas of physics and mathematics.

Q1

Is it true that Einstein didn't understand physics and that his theories of relativity are nothing but black magic?

A1

It is true that Einstein did not fully understand physics (universal physical laws) and did not distinguish it from what was not.

He used black magic (which he called a thought experiment) to combine different incompatible theories and situations to wrongly derive his theories of special relativity in 1905 and general relativity in 1915, which set the world back more than 100 years.

1- In his theory of special relativity [1,2,3], he attempted to prove the Lorentz transformation without knowing that this transformation is a universal law without proof.

He then used the black magic of two concentric spheres of light with the same center and moving independently of each other while their center is always the same, to achieve his false objective.

2- In his theory of general relativity, he once again used his black magic (thought experiment of an accelerating object in an accelerating gravity field) to arrive at his incomprehensible stress-strain tensor.

G μ ν (nu)= 8 Pi G / C^4 . T μ ν

We propose a more correct and precise stress-curvature matrix/tensor.

∇2xx ∇2xy ∇2xz ∇2xt U(x,y,z,t)

∇2yx ∇2yy ∇2yz ∇2yt U(x,y,z,t)

∇2zx ∇2zy ∇2zz ∇ zt U(x,y,z,t)

∇2tx ∇2ty ∇ 2tz ∇2tt U(x,y,z,t)

x

Cxy Cxy Cxz Cxt

Cyx Cyy Cyz Cyt

Czx Czy Czz Czt

Ctx Cty Ctz Ctt

= I (unit matrix) . . . Equation 1

The first matrix is called the stress matrix.

Stress is not a force/area scalar (a single component).

Stress tensor has 16 components.

Stress in a 4D unit x-t space is composed of 16 components, called stress tensors B

The second matrix is called the deformation or curvature matrix/tensor C.

It's a great start.

Contrary to Einstein, stress or energy density, like gravity, causes space to curve, not the other way around.]

Once again, Einstein's fatal error was to invert Equation 1, a flawed process that asserts falsely that curvature creates gravity, not the other way around.

The matrix equation 1 proposed by the author is

capable of solving the following two problems:

1- Special Theory of Relativity.

2- General Theory of Relativity.

The author demonstrated that the two theories constitute a single theory.

Why two?

The first theory is simply a special case of the second, as it should be.

The subject Foundations of General Relativity, Theory and Practice, aims to understand and explain the fundamental theoretical principles of this pillar of modern physics and to reconcile its deep theoretical connection with the nature of four-dimensional unitary spacetime (xyzt), in order to grasp its applications in contemporary practice.

Today we have two distinct theories of general relativity, the first is that of A. Einstein in 1915 and the second is that proposed by the author in 2025 as derived from the statistical theory of Cairo techniques.

Some people think that modern general relativity or second theory refers to the same classical theory and its continued application as Einstein's classical theory in 1915, which is a misconception.

Modern general relativity is very different from the original 1915 theory in many ways: among other things, it can explain sound waves in soundproof rooms, prove that special relativity can be derived and is a subset of the finer general theory, define and explain the dynamics of a vacuum, Not to mention the ability to solve the Schrödinger equation of quantum mechanics in its quadratic formulation and so on.

All these modern topics, among others, fall under the umbrella of modern general relativity, which classical general relativity cannot address.

Not to mention the ability to solve the Schrödinger equation of quantum mechanics in its quadratic formulation.

The main contribution of the author that led to all these new rational concepts in this article is the revolutionary definition of time t.

It is true that Einstein did not understand physics, because physics is nothing other than the universal law of nature.

He did not fully understand the universal laws of physics and did not distinguish between what was a universal law of physics and what was not.

He fell into the trap of not knowing that the laws of the Lorentz transformation are universal laws of physics.

*1- In his theory of special relativity in 1905[1], he attempted to prove the law of the Lorentz transformation without knowing that this transformation is a universal law without proof.

He then used the dark magic of the thought experiment of two concentric spheres of light with the same center moving independently while keeping their center at the same point.

Just to achieve his false goal of proving the law of the Lorentz transformation.

**2- In his theory of general relativity in 1915 [2], he once again used his black magic (thought experiment) to prove his incomprehensible stress-strain tensor.

G μ ν (nu) = 8 Pi G / C^4 . T μ ν . . . (3)

Which is nothing other than the universal Lorentz law in the 4-dimensional unit xyzt space.

The purpose of this article is to remove and replace Einstein's thought experiments in his special relativity and general relativity that were combined with other incompatible random theories and kept world science at a standstill for 100 years, without moving an inch forward.

Unlike Einstein, it is more natural and logical to imagine that the forces of the energy density matrix/tensor U(x,y,z,t) compress the xyzt space and not the other way around.

*1-We propose a more correct and precise space-time energy density matrix/tensor given by [3,4],

∇^2xx ∇^2xy ∇^2xz ∇^2xt]U(x,y,z,t)

∇^2yx ∇^2yy ∇^2yz ∇^2yt]U(x,y,z,t)

∇^2zx ∇^2zy ∇^2zz ∇^ zt]U(x,y,z,t)

∇^2tx ∇^2ty ∇^ 2tz ∇^2tt]U(x,y,z,t)

Where ∇^2xy = d^2/dx dy)partial, ∇^ 2tz =d^2/dtdz)partial, ∇^2tt=d^2/dt^2)partial . . etc.

We call it M1.

**2-We again propose another more accurate spatio-temporal curvature matrix/tensor given by [3,4],

Cxy Cxy Cxz Cxt

Cyx Cyy Cyz Cyt

Czx Czy Czz Czt

Ctx Cty Ctz Ctt

We call it M2.

Where Cxy=dxdy/xy, Cyy=dy^2/y^2, Ctz=dtdz/tz . . etc.

*** We apply the universal physical Lorentz transformation law in a 4-dimensional unitary xyzt space,

M1 * M2 = I . . . (4)

Where I is the unit matrix.

Equation 4 is itself the law of general relativity or the conservation of the spacetime element xyzt implied by the Lorentz transformation law.

In matrix formulation Equation 4 or the law of general relativity is expressed as [3,4],

∇^2xx ∇^2xy ∇^2xz ∇^2xt]U(x,y,z,t)

∇^2yx ∇^2yy ∇^2yz ∇^2yt]U(x,y,z,t)

∇^2zx ∇^2zy ∇^2zz ∇^ zt]U(x,y,z,t)

∇^2tx ∇^2ty ∇^ 2tz ∇^2tt]U(x,y,z,t)

X

Cxy Cxy Cxz Cxt

Cyx Cyy Cyz Cyt

Czx Czy Czz Czt

Ctx Cty Ctz Ctt

= I . . .(4*)

Some scientists believe that modern general relativity refers to the same theory and its continued application as Einstein's classical theory, which is a misconception.

Modern general relativity is very different from the original 1915 theory, which can explain sound waves in soundproof rooms, prove that special relativity is a subset of the finer general theory, define and explain the dynamics of a vacuum, and so on.

All these modern topics, among others, fall under the umbrella of modern general relativity, which classical relativity cannot address.

The main contribution of the author that led to all these new rational concepts in this article is the revolutionary definition of time t.

Time is defined not as a scalar number as a vector with four components: tx, ty, tz, tt, as introduced in the general relativity matrices M1 and M2.

Moreover time is defined for the first time as discrete not continuous with predefined time step dtt = log [(1+RO)/(1-RO)]=log 2.

Einstein and all the great scientists of the time considered time as a scalar of a real number without components but continuous with a scalar component.

Only in modern general theory of relativity is time considered as a vector having four components tx,ty,tz,tt [5,6,7].

This new concept of time radically changes the situation.

Stress is defined as a geometric force per unit normal area where force F is a vector of 3 geometric components Fx, Fy, Fz but the new modern force in xyzt space should now be composed of four components to make room for the new unconventional component which is Ft.

The time appears as a new axis wove in the geometric space x,y,z and the stress tensor should have 16 components as shown in matrix M1.

Stress in a 4D unit x-t space is composed of 16 components, called stress tensors B

Similarly, the second matrix M2 which is the deformation or curvature matrix/tensor C must have 16 components.

This is a great start. But unlike Einstein, Equation 4 implies that the stress tensor is a Laplacian of the energy density, which causes space to bend, unlike Einstein who did the opposite.

Once again, Einstein's fatal error was to invert Equation 1, a flawed process that incorrectly asserts that curvature creates gravity (or any other energy density field), not the other way around.

We assert that the new matrix equation 4 proposed by the author is capable of solving the following three problems:

1- Special Theory of Relativity.

2- General Theory of Relativity.

3- Schrödinger's equation squared in quantum mechanics.

etc.

Einstein presented his special theory of relativity in 1905, followed by his general theory in 1915.

However, as the author demonstrated in Section III, **the two theories constitute a single theory.**

Why two?

The first theory is simply a special case of the second, as it should be.

Q2

What is the Theory of Everything and how can it lead to the modern theory of general relativity?

A2

In summary, in matrix form, the Theory of Everything is based on the assumption of the existence of a square relaxation transition matrix Bnxn (n being the number of free nodes, not to be confused with the number of iterations or time steps N) for the time-dependent energy field U(x,y,z,t), in classical and quantum physics, such that:

U(x,y,z,t+dt)=B.U(x,y,z,t) + B^N . U(x,y,z,0) . . .(5)

We assert that no classical or quantum physics, nor even any mathematics, can escape a derivation of Equation 5 or be a subset of it.

In other words, Equation 5 is itself the long-sought theory of everything.

Equation 5 leads to the existence of a transfer matrix D(N) such that:

U(x,y,z,t)=D(N).(b+S) + B^N.IC . . . . . (7)

Where,

D(N)=B+B^2+B^3+ . . . . +B^N . . . . (8)

Where U(x,y,z,Ndt) is the classical and/or quantum energy density at the free point or node x,y,z and at time t = Ndt, where N is the time integer for the number of jumps or iterations woven in the Cartesian axes x,y,z and dt is the time interval or time jump.

Recall that we currently know of only two transition matrices: the well-known mathematical statistical Markov matrix and the proposed statistical transition matrix B.

Clearly, matrix B offers a significant improvement over the Markov matrix M because it takes into account the boundary condition vector b and the source term vector s, unlike the Markov matrix. b is the boundary condition vector, arranged in the appropriate order, and S is the appropriate source/sink term, in the appropriate units, placed at the main diagonal node Bii.

Clearly, D(N) is given by the finite sum of the matrix series,

D(N)=B+B^2+B^3+ . . . . +B^N . . . . (8*)

*It should be noted that the eight equations 1 through 8, derived from statistical theory known as the "Cairo techniques," are not entirely new, but have been used effectively over the past five years to solve almost all types of scientific problems in closed volumes controlled by Dirichlet boundary conditions.

These problems include:

i) the numerical solution of Laplace and Poisson PDEs;

ii) the numerical solution of the heat diffusion equation in the most general case;

iii) the numerical solution of time-dependent quantum mechanical problems in infinite free space under an arbitrary external potential

iv) numerical differentiation and integration;

v) the numerical derivation of stationary statistical distributions, such as Gaussian or normal distributions.

The five facts mentioned above lead to the following conclusion:

Cairo intelligence techniques = natural intelligence = artificial intelligence in the strict sense = unified field theory.

The question arises:

if the Theory of Everything, or Unified Field Theory, known as the "Cairo Technique," works with exceptional success and has been known and published for over four years, why is it not generally accepted in the current scientific community?

The answer is simple and lies primarily in a flaw in the theory:

It reveals the fatal errors of Niels Bohr, E. Schrödinger, and A. Einstein, who dominated science for over a century.

This theory therefore does not please the iron guardians of the theories of relativity of Niels Bohr, E. Schrödinger and A. Einstein of 1905 and 1915 and especially the iron guardians of the classical equation of Schrödinger of 1927 whose imaginations or hallucinations represent it as the theory of all things.

But who are the iron guardians of the classical Schrödinger equation as interpreted by Niels Bohr, Or more precisely, the iron guardians of Niels Bohr himself?

The phrase "iron guardians of the Schrödinger equation" refers to a group of physicists and mathematicians who ardently defend the equation and its classical interpretations, often resisting any attempt to modify or question it, sometimes going so far as to reject any perspective or alternative.

They are described as dogmatic in their adherence to the equation and its established interpretations, sometimes stimulating progress in quantum mechanics by rejecting new ideas or alternative approaches [Google search].

In other words, the iron guardians of the classical Schrödinger equation are those indoctrinated physicists and mathematicians who defend this incomplete and misleading equation until their last breath and who are, in reality, the iron guardians of the scientist Niels Bohr himself.

They know that sooner or later, the false theories of classical general relativity of Einstein and that of Schrödinger, as interpreted by Bohr, will disappear and they will disappear with them.

To return to the initial question, how can the Cairo techniques lead to the modern theory of general relativity, we assert that,

∇^2xx ∇^2xy ∇^2xz ∇^2xt]U(x,y,z,t)

∇^2yx ∇^2yy ∇^2yz ∇^2yt]U(x,y,z,t)

∇^2zx ∇^2zy ∇^2zz ∇^ zt]U(x,y,z,t)

∇^2tx ∇^2ty ∇^ 2tz ∇^2tt]U(x,y,z,t)

X

Constant

X

Cxy Cxy Cxz Cxt

Cyx Cyy Cyz Cyt

Czx Czy Czz Czt

Ctx Cty Ctz Ctt

= I . . .(9)

Clearly, the 12 off-diagonal curvature input components corresponding to the shear force reduce to zero in the external empty space.

In other words, the 16 input elements C of the curvature matrix are reduced to only four, because the shear stress corresponding to the off-diagonal position is zero in the vacuum of space.

Q3

How can we derive the special theory of relativity from the general one?

A3

We all know that Einstein's classical general relativity in 1915 is unable to answer this question, but the modern general relativity introduced by the author can do so on its own, which shows that the new proposed theory is more complete.

The answer to this question emerges from the formulation of the second general theory of relativity introduced by the author in 2022,

∇^2xx ∇^2xy ∇^2xz ∇^2xt]U(x,y,z,t)

∇^2yx ∇^2yy ∇^2yz ∇^2yt]U(x,y,z,t)

∇^2zx ∇^2zy ∇^2zz ∇^ zt]U(x,y,z,t)

∇^2tx ∇^2ty ∇^ 2tz ∇^2tt]U(x,y,z,t)

X Constant

Cxy Cxy Cxz Cxt

Cyx Cyy Cyz Cyt

Czx Czy Czz Czt

Ctx Cty Ctz Ctt

= I . . .(4*) It is clear that the constant in the matrix above =C^2 where C^2 is the mass-energy transformation constant E=mC^2 (or C^2=E/m).**Equation 4* above is the equation of general relativity in unitary 4D xyzt.**

To deduce the equation of special relativity in 1 dimension x the above matrices have to be reduced to [8,9],

∇^2xx 00 00 ∇^2xt]U(x,y,z,t)

00 00 00 00]U(x,y,z,t)

00 00 00 00]U(x,y,z,t)

∇^2tx 00 00 ∇^2tt]U(x,y,z,t)

We call it M3.

X

Cxx 00 00 Cxt

00 00 00 00

00 00 00 00

Ctx 00 00 Ctt

We call it M4.

= I . . .(10)

It is clear that the matrix product M3 X M4=

∇^2xx . Cxx +∇^2tx . Ctt

For a moving particle subject to Newtons law of motion in its general form,

X . t = X* . t*

The last step is to introduce the parameter λ (which should be equal to √[1-v^2/C^2]).

Solving for λ to find a linear solution, we obtain:

λ = √[1-v^2/C^2], **which corresponds to Einstein's special theory of relativity.**

The West is losing the battle for the theory of relativity!

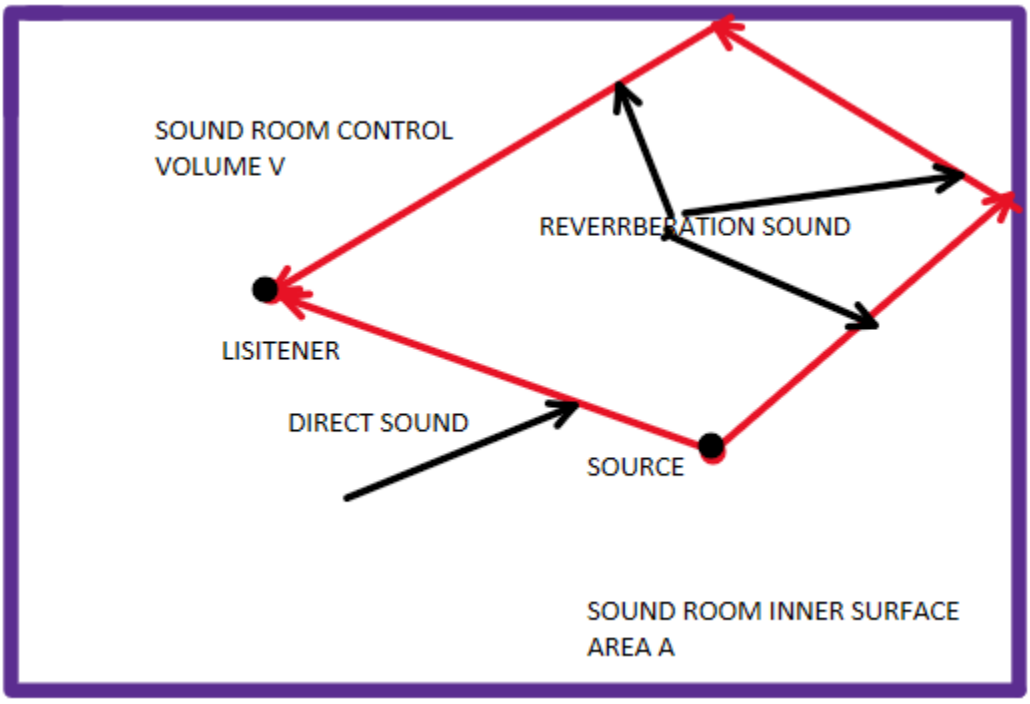
Q4 –

Is there a generally accepted theory regarding audio rooms?

A4 –

To our knowledge, there is no generally accepted rigorous theory describing the reverberation time or the spatiotemporal evolution of the sound energy density UJm-3 inside audio rooms. The only notable attempt was made by Chiara [11].

Chiara [11] considers that the sound energy in the room is composed of two components: a radiation component and a reverberation component, as shown in Figure 2.



Fig,2. SOUND ROOM AS CONTROL VOLUME V

Fig. 3. Audio room described as control volume.

Chiara's attempt at a description was pioneering, but its success was limited.

However, the numerical statistical theory of Cairo techniques offers a rigorous theory related to PDEs, dU/dt)partial = α ∇^2 (U) + S, where U(x,y,z,t) is the sound energy density Jm-3 and α m^2 sec^-1 is the sound energy diffusivity.

The second distinct approach to solving the quantum mechanical system is matrix mechanics which should be adequate and effectively replace the time-dependent PDE.

We note here that the first approach to implementing matrix mechanics to solve various situations in quantum systems was introduced in 1925, when Heisenberg, Born, and Jordan presented their first consistent matrix formulation of quantum mechanics.

This formulation studies the mathematical and physical laws and rules of subatomic objects subjected to an external potential field and is therefore capable of explaining the behavior of so-called quantum systems.

The Heisenberg matrix allowed the calculation of the spectral lines of the hydrogen atom, a key step in the development of quantum mechanics but which failed outside of it [12].

Note that: **The Heisenberg matrix is neither a transition matrix nor a statistical matrix.**

Moreover, the same drawback of the Schrödinger PDE is found in the Heisenberg-Born-Jordan matrix, as it operates, still in 3D geometry and in real time, as an external controller.

This is why it is somewhat strange, incomplete, and even misleading.

The battle between the matrix quantum mechanics of Heisenberg, Born, and Jordan and Schrödinger's PDE lasted from 1927 to 1930, when the Heisenberg matrix was finally defeated and withdrawn.

This is known as the fall of matrix mechanics.

iii-The breakthrough came in 2020, when the author of this article introduced a revolutionary new statistical theory called Cairo techniques operating in a 4D unitary x-t space and working on chains of transition matrices B which is expected to be complemented by the advanced discrete theory of artificial intelligence proposed by the same author [1,2,3,4].

This theory, which is in itself an advanced concrete theory of artificial intelligence, is sometimes called the simulation theory of mother nature's intelligence.

Ψ^2 is needed to express the quantum energy density flux (U(x,y,z,t) = Ψ^2 (x,y,z,t)) and we therefore propose a new Schrödinger equation for Ψ^2 which should have the form of the energy density diffusion PDE such as that of thermal conduction.

The same is true for Heisenberg matrix which we should replace with its square to have the form of the energy density transition matrix.

Therefore, such a theory, which accurately models the behavior of nature, has proven capable of solving time-dependent situations in classical and quantum physics in the most general cases, as well as pure mathematical problems.

In conclusion, we again hypothesize the following:

It is true that Cairo's intelligence techniques = natural intelligence = artificial intelligence in the strict sense = Theory of Everything.

It is worth noting that the statistical theory of Cairo techniques is expressed primarily in matrix mechanics rather than in PDE scalars or vectors. Therefore, this theory may lead to the revival or renewal of matrix mechanics.

Q5-

Is it true that the quantum mechanics transition matrix Q equals the square root of the B-transition matrix?

A5

It is true that Q=SQRT(B)

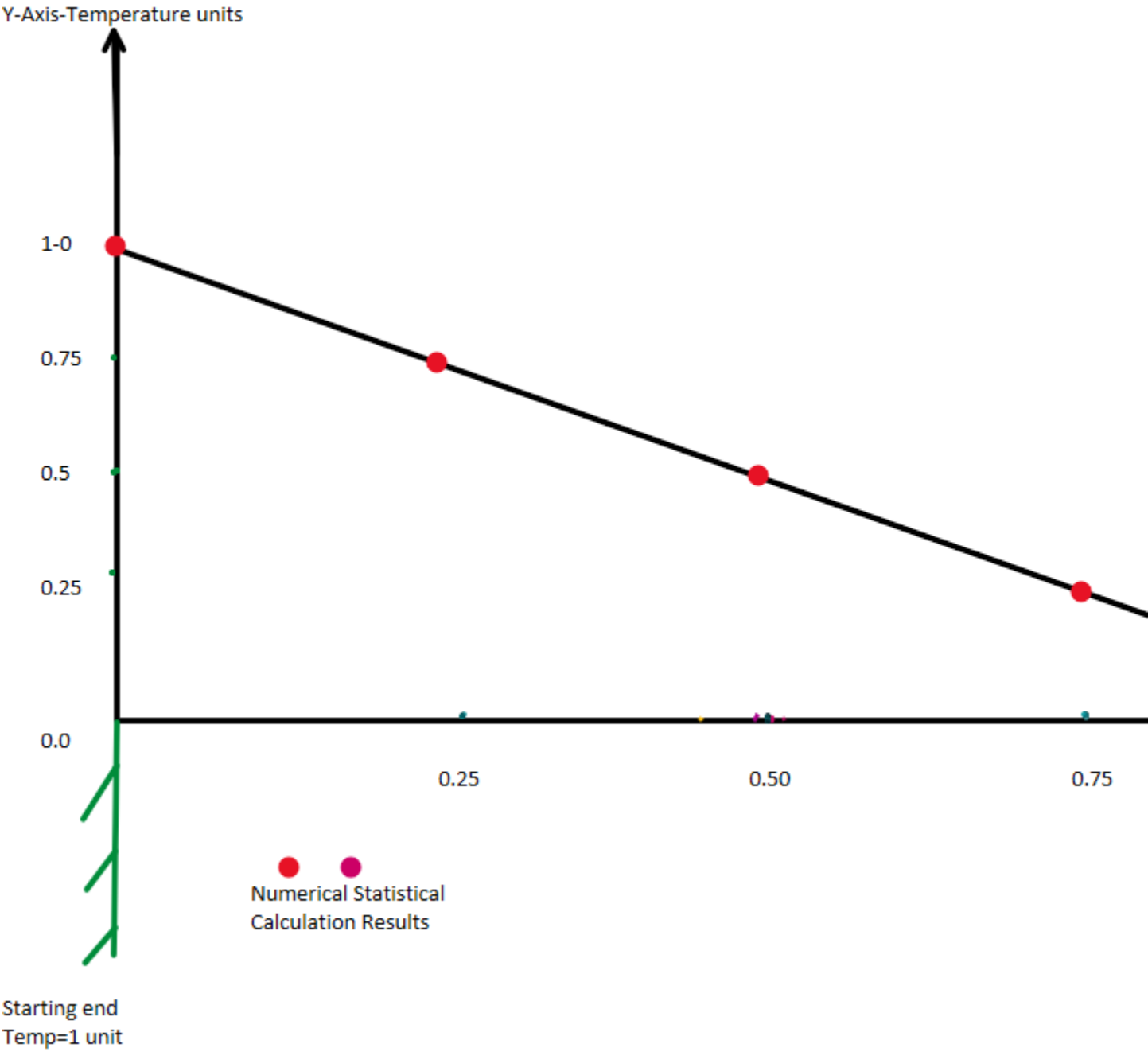


Fig 3. Thermal energy density (temperature T) along a long metal bar with one end subject to Dirichlet boundary conditions.

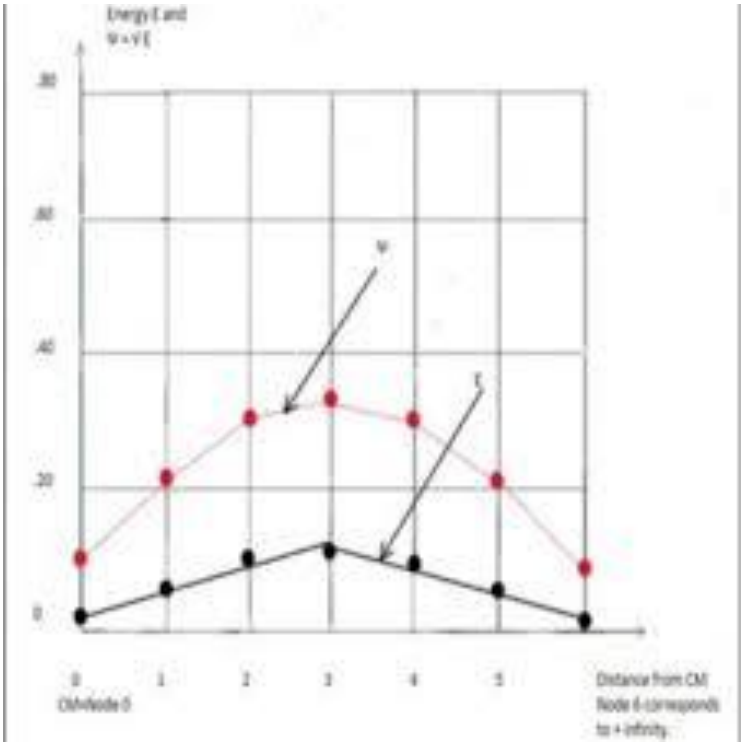


Fig 4. Showing that the wave function Ψ is equal to the square root of the thermal energy density T shown in Fig 3.

It is true that Q=SQRT(B)

Q6-

How to introduce and define what is called control volume?

A6

In fact, the 4D unitary control volume x-t is the cornerstone of the statistical theory of Cairo techniques which replaces the classical infinite space R^4 (3D geometry with real time as external controller) of limited utility.

Equation 4 and the entire theory behind this work of unified field theory or theory of everything belongs to a closed volume contained within a closed area subject to Dirichlet boundary conditions.

The unified field theory is founded on THREE modern new concepts [2-6]:

1- The modern concept of a closed control volume, bounded by a closed surface A in 1D, 2D, and 3D, subject to Dirichlet boundary conditions, as illustrated in Figures 1a and b.

This modern concept replaces the classical concept of infinite space R^4, which has limited usefulness.

2- For any closed control volume, bounded by a closed surface A and subject to Dirichlet boundary conditions, there exists a statistical transition matrix B such that:

$$U(x,y,z,t+dt) = B \cdot U(x,y,z,t) \quad \ldots\ldots (6)$$

Equation 6 alone is the long-sought unified field theory, or theory of everything.

Equation 6 has no mathematical proof.

We assume that Equation 4 is a universal law of physics essential for the stability of nature by relaxing any spatiotemporal energy disturbance.

3- When conditions 1 and 2 are met, they constitute the unified field theory, which is the third modern concept expressed as follows [10]:

Cairo intelligence techniques = natural intelligence = artificial intelligence in the strict sense = unified field theory.

Fig. 5. Shows a 3D control volume which is our 3D laboratory with n free nodes.

It is easy to note the limitation or bounding at infinity and the continuity of the solution function and its first derivative.

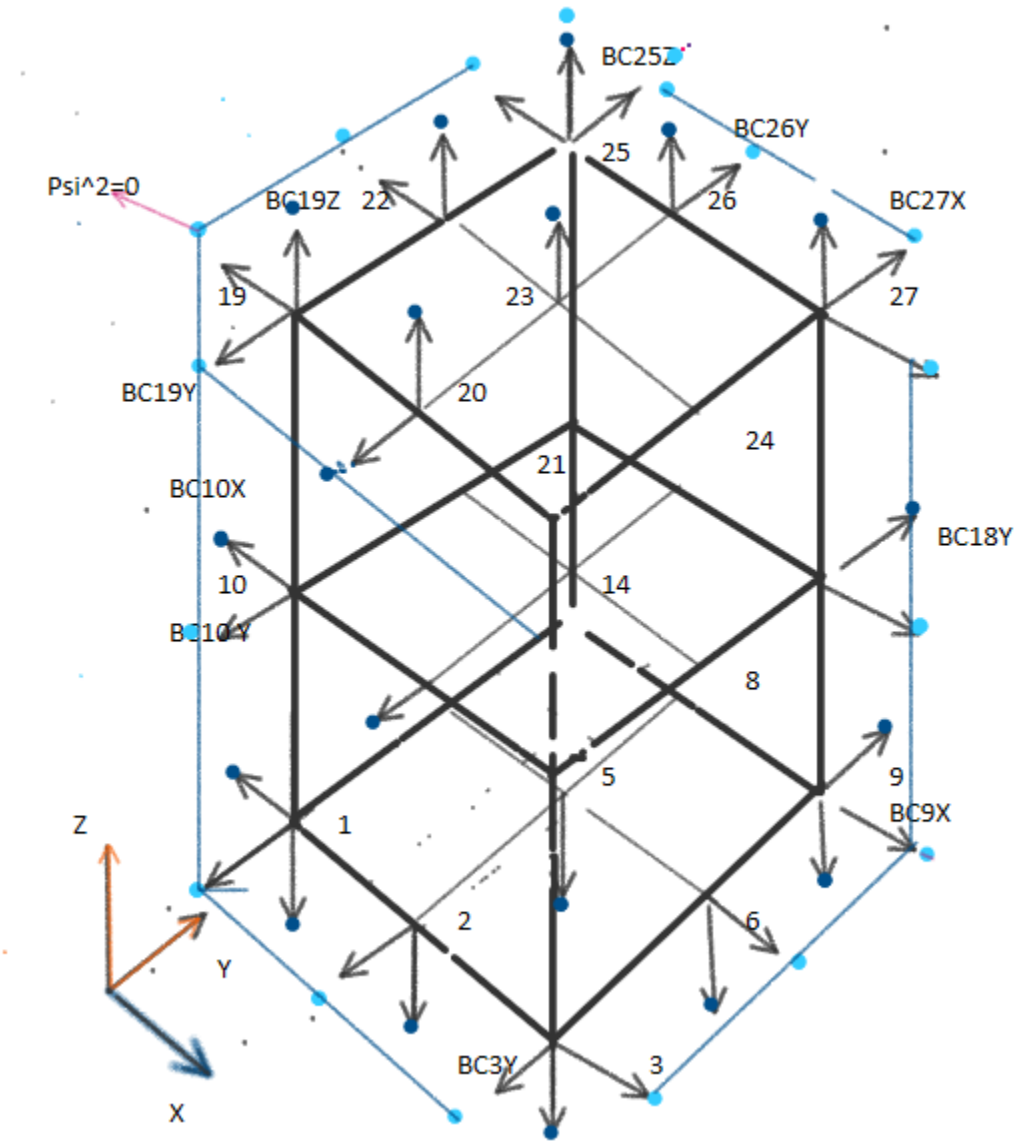


Fig. 5. Shows a 3D control volume which is our laboratory with n free nodes.

Cairo intelligence techniques operate in four consecutive steps within their control volume CV, as follows:

1- Discretize the control volume into a one-, two-, or three-dimensional geometric shape of the problem into n equidistant free nodes, as shown

in Figures 1a and 1b (not to be confused with N, the number of iterations or time steps).

2- Construct the transition matrix B for the given geometric shape of the problem.

3- Carefully select the numerical value of the principal diagonal element RO, as explained in various solved problems in Section III.

4- Construct the transfer matrix D(N), which is the time-domain solution to the physical or mathematical problem in question.

D(N)=B+B^2*B^3+. . . . . +B^N . . . . . (7)

Note that when N is sufficiently large, expression 5 reduces to:

D(N) = {1/(I-B) -I} . . . . . (8)

Where I is the nxn unitary matrix.

It is worth noting once again that the Cairo Techniques Control Volume functions as an open LABORATORY (or kitchen) to prepare answers and questions on everything, whether they concern classical/quantum physics or mathematics.

It is quite surprising to note that behind all this methodological structure, behind this fidelity to the physical data, something begins to emerge: a tension towards the origin of the center of mass or midpoint (in accordance with the theory of general relativity).

The origin of the control volume of the quantum mechanical system is the center of mass (CM) or midpoint (MP) as shown in Fig.1a, 1b.

It is also surprising to note that the main diagonal elements or entries B ii , i=1 to n of the matrix B have a very particular physical meaning:

i-All entries of the diagonal vector RO ∈ [0,1] represent the ratio of the stored or remaining energy at the free node point (i,i) at the end of the transition time interval dt.

ii-Therefore it also predicts the physical nature of the process:

*RO=0 corresponds to emw in vacuum.

*RO=const .GT.0 corresponds to heat diffusion in material medium.

*RO=const .x (saw tooth shape)

These different geometric shapes of RO are presented in Fig.1,2).

Note also that the transition matrix B is completely different from the classical density matrix B, which is neither a transition matrix nor a statistical matrix.

In fact, Equation 4 of the transition matrix completely replaces the original time-domain partial differential equation (PDE) of the energy density in the control volume, which we completely ignore. It should be noted that the physical classification of entries along the main diagonal of the transition matrix (RO) presented above in Figure 2 cannot be justified mathematically.

Mathematics lags behind physics in this regard.

The question arises: if the transition matrix B of classical physics is well defined by its four statistical assumptions [1, 2, 3, 4], what about the transition matrix Q of quantum physics?

The answer, in its simplest form, is:

$Q = \sqrt{B}$ . . . . . (7)

Equation 7 shows that the square root of a real square matrix is a complex square matrix if it exists [7, 8].

Furthermore, since the complex matrix Q must be Hamiltonian, then its eigenvalue, which is the eigenvalue of the energy, must be real [7, 8,9,10].

Another question arises: if the statistical transition matrix B of classical physics and the statistical matrix Q of its square root work efficiently

everywhere since 2020, from classical physics to quantum physics, and even pure mathematics, why are they not widespread in the scientific community? Again, the answer is simple: this simple matrix mechanics (B and Q) reveals Nil Bohr's mistakes. Nil Bohr never worked in a 4-dimensional unitary x-t space and therefore almost all his conclusions in physics and mathematics are either incomplete or misleading.

In order not to worry too much about the details of the theory, let's move on to the subject of the next section of questions and answers, Section III.

Q7- Is the second theory of quantum mechanics is tensor mechanics.

A7-

The short answer is yes.

The statistical transition matrix B is an n× n square matrix equivalent to a tensor of the second rank where,

x= i dx

y= j dy

z= k dz

t= N dt

The statistical theory of Cairo techniques, which models the behavior of nature, has proven capable of solving time-dependent situations in classical and quantum physics in the most general cases, as well as pure mathematical problems.

Our description of time evolution using the B-matrix equation is clear, concise, and perfectly captures almost all physical systems.

Furthermore, the use of AI is a major asset, as it allows us to construct a falsifiable, consistent, and dimensionally sound theory.

The conclusion is that the transition matrix B works as follows:

Tensor Bi,j,k N .

where i, j, k are lowercase indices and N are uppercase indices.

which is a second-rank tensor where all indices i,j,k,N are zero or positive integers.

N is the number of iterations or time jumps of dt

The tensor nature of the B matrix is revealed.

Thanks to matrix/tensor technology and artificial intelligence, we have automatic solutions to different temporal situations.

Various components and similar matrices can model or simulate the natural grace of artificial intelligence and statistical algorithms.

Again, we know of no other method for the Theory of Everything, which means that Equation 4 is the only one.

Now, consider a cube of 27 equidistant free nodes subject to 81 Dirichlet boundary conditions reduced to 56 as shown in Fig.3.

Figure 3. A cubic control volume of the energy density field discretized into 27 equally spaced free nodes, subject to 81 Dirichlet boundary conditions reduced to 56.

I= f(x1,y1,z1) . SW1 +f(x2,y2,z2) . SW2. . . + f(x27,y27,z27) . SW27 . . . . (8)

Where SW,s are the statistical weights of the triple integral.

The statistical transition matrix B 27x27 with RO = 0 for this cubic energy density field space is given by,

The numerical statistical theory of Cairo techniques predicts a relationship between the thermal diffusivity α and the entanglement speed which is that of the propagation of the information signal C from the time exponent of the natural free cooling curve !.

For example, the time dependence of the free cooling curves for a metal cube with side length L can be described by the matrix chains B.

The strings of Matrix B provide for the first time in a century a unique and rigorous proof of W. Sabine's experimental reverberation formula:

U(t) = U(0). Exp -t [Constant. Area / C. Volume]. . . . . (9)

C is the entanglement velocity, equal to the signal transfer velocity of the accompanied secondary wave.

Using equation 5:

The reverberation velocity of sound is obviously the speed of sound in air at NPT = 330 ms^-1.

An exact result.

The same thing happens in the free cooling curve of metal cubes and leads to the following formula,

$C = T½ * \log 2 * L^2 / (\text{thermal diffusivity } \alpha)$ . . . . (10)

T½ is the half-life, in seconds, of the cooling curve of a metal cube of side length L, to be measured experimentally.

In 2023, the author conducted experimental work to measure T½ of a free cooling curve for different metals.

We found that T½ for a 10 cm aluminum cube was 45 seconds

and that for a similar iron cube was 100 seconds (11).

The thermal diffusivity α is found in thermal tables:

α (Al) = 1.18 E-5 MKS units

α (Iron) = 2.5 E-5 MKS units

If we substitute the above numerical values of α, L and T1/2 into equation 6, we obtain C, the speed of light, equal to 2.95 m s^-1 for both cases.

But the question arises: what is happening here, and why is the thermal diffusivity α related to the speed of light C?

The answer is simple:

Heat diffusion in the control volume of the 10-cm-long heat diffusion cube is associated with a control information wave, which implies:

No diffusion without permission.

The speed of the control information or entanglement wave is equal to that of light C [15].

Q7-

Can the statistical theory of Cairo techniques explain the formation and explosion of the Big Bang?

A7-

The brief answer is yes.

Note that Neither quantum physics nor classical physics can provide an answer to this question. the Schrödinger PDE solution does not allow for the singularities essential to the formation and explosion of the Big Bang.

The solution to the Schrödinger equation generally does not allow for singularities in the same way that general relativity does. The classical Schrödinger equation is a linear partial differential equation governing wavefunctions, which describe quantum systems.

These wavefunctions must remain finite and normalizable (i.e., their total probability integrates to one), which rules out the presence of singularities where the probability density would become infinite or undefined.

These singularities are also essential for the collapse of giant stars into tiny black holes.

In other words, The solution to the Schrödinger equation generally does not allow for singularities in the same way that general relativity does. The Schrödinger equation is a linear partial differential equation governing wavefunctions, which describe quantum systems. These wavefunctions must remain finite and normalizable (i.e., their total probability integrates to one), which rules out the presence of singularities where the probability density would become infinite or undefined.

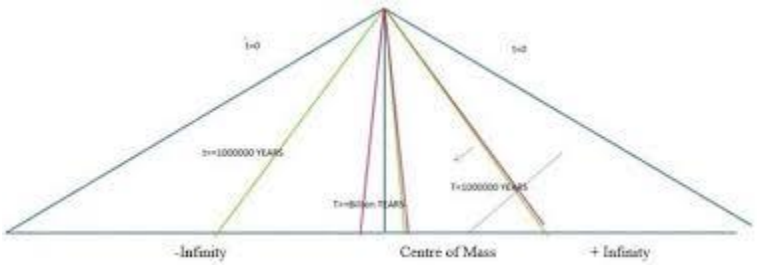
In contrast, general relativity permits singularities—points where physical quantities such as density and curvature diverge—because it is a classical, nonlinear theory. The Big Bang and black hole formation are both predicted to involve such singularities, where known physics breaks down. Since the Schrödinger equation does not accommodate such infinite-density points, this suggests that a purely quantum mechanical description of the universe (or black holes) would need a deeper framework beyond standard quantum mechanics.

The big bang is "denied" by classical quantum mechanics.

These singularities are also essential for the collapse of giant stars into tiny black holes.

However, the formation and explosion of the Big Bang are well explained by the second modern theory of quantum mechanics [4,13].

Entanglement is a universal law and triggers a force directed toward the center of mass (CM) or midpoint (MP).



X goes to - ∞ X=0 (CM) X goes to ∞

Fig.6.Formation of Big Bang-Early stages [4]

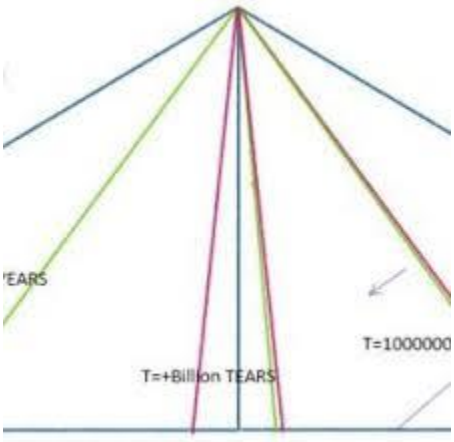


Fig.6*.Formation of Big Bang-Early stages [4]

IV.Conclusion

The author presents, explains, and resolves seven important unanswered questions, including Einstein's theory of relativity, using the method of the Cairo statistical theory of techniques.

The numerical answer is complete and precise, and has never been addressed before, demonstrating that the numerical method of the Cairo statistical theory of techniques is the only theory of everything.

The author introduces and explains 5 essential rules or laws in physics that contains the theory of everything,

*Rule 1: The universal laws of physics are unprovable and cannot be deduced or proven mathematically.

Anyone who mistakenly attempts to mathematically prove one or more universal laws of physics is practicing black magic, not science.

Note that the great A. Einstein fell into this trap when he attempted to deduce the universal law of the Lorentz transformation in 1D and 3D

through thought experiments, calling them the theories of special and general relativity, which is nothing more than low-grade black magic.

*Rule 2: Mother Nature operates in a unitary 4D xyzt space where time t is integrated over the three axes of geometric space as a dimensionless number N.

We believe that all classical/quantum physics, or even any mathematical formula operating in classical D^4 space (3D geometry with real time as the external controller), is incomplete and misleading.
Rule 3

*: Rule 3 implies that time t cannot be expressed as a scalar quantity consisting of a scalar number t seconds, but must be expressed in four components: the vector quantity tx, ty, tz, tt.

*Rule 4:The nature of the everything solution properties whether classicl physics, quantum physics, relativity, mathematics ..etc follows from the nature of the input elements of the main diagonal RO ∈ [0,1[or Rii∈ [0.1],

Fortunately, the universal physical law governing both Einstein's special theory and the general theory of relativity in 1905 and 1916 is the famous Lorentz transformation law in 1 geometric dimension (x-t) and 3 geometric dimensions (x, y, z, t) respectively, which makes it easy and simple to get started and find a rigorous explanation and proof of this important topic of modern relativity in less than a page.

special and general theories of 3 is linked to the quantity of spacetime curvature like the case of Einstein general relativity of 1915.

Only when the curvature of spacetime is significant, as in the case caused by the gravitational field near the Sun or any heavier star, should physical quantities be expressed in tensors, otherwise the scalar or vector description would suffice.

This is similar to the case of special relativity where it applies its relativistic quantities only when the object's speed v is sufficiently high compared to the speed of light C, otherwise the classical non-relativistic description would suffice.

*Rule 5:The author introduces , defines, and explains the proper concepts of space-tlme curvature, the proper concept of space-time stress tensor and introduces the universal physics law,

Stress tensor X Curvature tensor =I which is equivalent, more correct and more precise than Einstein's famous curvature stress tensor in 1915.

This means that there are two distinct theories of general relativity, the classical one by Einstein which is obsolete and the modern one proposed by the author.

Examples f the choice of the input elements of the main diagonal RO ∈ [0,1[or Rii∈ [0.1],are as follow:

i-Ri=0 corresponds to classical physics such as Laplace and Poisson PDE. With Dirichlet boundary conditions vector b and source/Sink term vector S.

ii- Ri=constant GT zero corresponds to classical physics such as heat diffusion in metals (Rii=0.22 for Aluminum and O.2 For low carbon steel). With Dirichlet boundary conditions vector b and source/Sink term vector S.

iii-Ri=0 in infinite vacuum with zero fall conditions (b=0 and S=0)corresponds to proposed modern theory of general relativity.

iV-Ri=0 in an infinite vacuum with zero fall conditions (b=0 and S=) with Rii in the shape of a sawtooth in the geometric coordinates x, y, x.

There are two distinct forms or expressions of Einstein's theories of relativity: Einstein's classical special relativity in 1905 and Einstein's general relativity, introduced in 1915, where the author proved both

theories to be false and based on inconsistent thought experiments that the author calls black magic.

The author presents and explains 5 top contributions never mentioned before,

1- Notion of control volume CV contained in a closed surface A subject to Dirichlet boundary conditions. This control volume appears as a four-dimensional unit space xyzt, used as a laboratory for the development of new rules and theories, instead of the classical infinite space R^4 (three-dimensional x, y, z with t in real time as external controller), which is incomplete and misleading.

The Schrödinger squared theory is a remarkable tensor theory of quantum mechanics, which exists and operates in a 4-dimensional unit x-t space and is therefore more complete than the classical theory.

The author introduces and defines two important concepts: the control volume (in a 4-dimensional unit x-t space) and the statistical transition matrix, never before known in classical or quantum physics.

He also introduces and explains entanglement as a universal law related to the finite speed of the information signal (C).

This shows that entanglement can be neither instantaneous nor infinite. The author also examines whether the West is losing the battle of quantum mechanics. Classical mathematical integration is defined and evaluated in 3D for the first time (hypercube).

Finally, the formation and explosion of the Big Bang are presented and explained.

NB. The author uses his own double precision algorithm, such as that of references 20,21,22.

No ready-to-use Python or MATLAB algorithms are needed.

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