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How to generate new mathematics

Dr Ismail Abbas

Abstract

Most people believe that mathematics is a closed field where original mathematical research has been abandoned for decades, which is completely false.

The author believes that there are thousands of new mathematical rules and formulas still hidden, waiting to be discovered or generated [1,2,3].

The question arises: how to generate such new mathematics?

The author believes that there are three most common methods for generating new mathematics, the choice between them depends on the user's taste, knowledge and experience, namely:

i- Use existing mathematics, composed of a nearly infinite number of axioms and theories, to generate new mathematics.

Mathematics can generate new mathematics.

ii - Use of four-dimensional topology to describe and analyze quantum mechanical systems, based on the 1927 Schrödinger equation, to generate new expressions and formulas describing vacuum dynamics.

Fundamental questions about the nature of cosmic space related to the universal laws of thermodynamics, such as the entropy of

free space, the density and temperature of dark matter, etc., remain *unanswered.*

iii - Application of the theory of everything, derived from the statistics of B-matrix chains, to the physical control volume currently under study.

The third theory iii which is the subject of this article, operates in the most recent and promising space, discovered by the author only in 2020, and yet successfully applied to generate new mathematical and physical rules and theorems, such as:

1 - Generation of a new complex quantum transition matrix Q for the Schrödinger PDE and definition of a complex transfer matrix for the time-independent steady-state solution for the complex ES introduced in 1927.

It should be noted that the statistical theory of Cairo techniques (2020) does not apply the FDM techniques, but rather uses the theory and practice of the 4D control volume previously explained in several previous articles.

2 - Generation of a new theory of special and general relativity, other than Einstein's.

3 - Numerical resolution of all types of time-dependent PDEs in their most general form, without resorting to FDM techniques.

Finally, it should be noted that the purpose of this article is not to underestimate the great achievements of the great physicists Einstein, Schrödinger, Heisenberg, Minkowski, Hilbert, Rieman, among others, but to address the main flaws in their theories, if any.

I.INTRODUCTION

Some might think this article is a bit imaginative and full of passion for discovery, but it is absolutely original, true and deeply thoughtful.

Let's start by correcting the common misconception that mathematics is a closed field.

In reality, it is more dynamic than ever.

The author estimates that thousands of new rules and theorems can be demonstrated, new structures explored, and deep connections discovered, especially in areas such as algebraic geometry, number theory, category theory, mathematical physics, and even the foundations of artificial intelligence, simply by using the proposed 4-dimensional unitary xyzt space [2,3,4].

Thus, the hypothesis that "original mathematical research has been abandoned" is indeed true, but not for the reasons given by mathematicians. Regarding the "methods" proposed to "generate new mathematics," Option ii mentions a four-dimensional topology to describe classical and quantum mechanical systems, not based on the classic Schrödinger equation (SE) of 1927.

Furthermore, SE does not allow for the description of the density and temperature of dark matter, open questions in astrophysics, generally not resolved by the invention of new isolated mathematical formulas.

It should be noted that the author assumes that modern topology in the 4-dimensional unitary xyzt space is preserved under continuous deformations and that this property of the relevant branch of mathematics is likely to generate new mathematics.

Option iii raises serious concerns. Is the transition matrix B, based on the emergence of the theory of everything, well accepted within the mathematical and physics community.

There is an unjustified objection to the proposed new theory of relativity introduced by the author (other than Einstein's) that the new theory is not yet supported by new experimental physics or established old theoretical physics, which makes the proposed theory mere speculation and not mathematical or physical research.

The answer is simple and can be found in the same experimental evidence as Einstein's classical relativity of 1905 and 1915 since the conclusions and predictions of the new relativity and Einstein's are almost the same.

In other words, the experimental evidence for the theories of relativity (special and general relativity) proposed by the author in 2022 is in fact the same as Einstein's.

The conclusions and predictions of the theories of relativity proposed by the author in 2022 are the same as those of Einstein in 1905 and 1915.

Moreover, the author's general relativity is Hamiltonian and subject to the universal laws of physics, unlike Einstein's.

So yes, the hypothesis that "original mathematical research has been abandoned" is indeed true, but for exactly the reasons suggested by the author and not by the mathematicians themselves.

Now, about the need for methods or techniques to generate new mathematics:

Although topology has been successfully used in modern quantum physics to extend the scope of current quantum mechanics, the Schrödinger equation itself originated in an awkward manner.:

it is non-relativistic and does not directly address the dynamics of the present-day vacuum or dark matter.

Consequently, the density and temperature of dark matter remain open questions in astrophysics.

Option iii raises serious concerns.

Why is the revolutionary theory of everything [5,6] derived from B-matrix string statistics not widely recognized or accepted within the mathematical or physics community?

Similar objections have been raised about the author's proposed new Schrödinger equation for the square of psi, which ignores the most important quantum-mechanical parameter h and that $|\psi|^2$ is a probability density, not a wave function, and does not obey a linear Schrödinger-type equation, which is an absolutely false objection.

The author encourages the distinguished researchers of new generation of physicists and mathematicians to pose this objecting question to the eminant scientists of today's for an justification or explanation, and I hope they will get one.

The author's recommendation to any budding mathematician or physicist:

Your imagination is your greatest asset. But channel it by mastering the basics.

In short: yes, new mathematics isn't born every week, or even every month, as it should be.

To avoid dwelling too much on the details of the introduction, let's skip ahead to the theory in Section II below.

II.Theory

The numerical statistical theory of Cairo techniques and the resulting B-transition matrix chains operate in the closed 4D xyzt control volume subject to the Dirichlet boundary conditions proposed by the author.

The simplest control volumes are shown in Figures 1 and 2 [4, 5, 6].

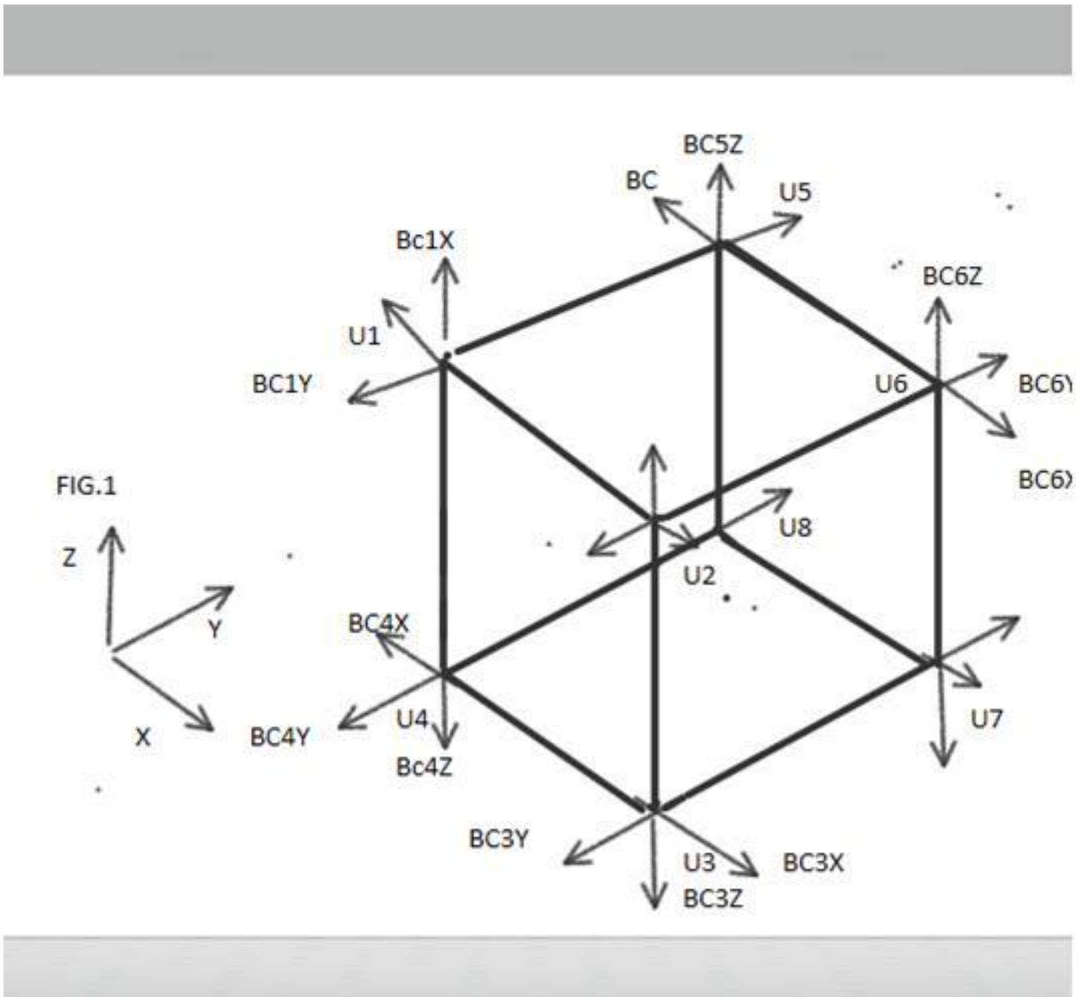

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Fig. 1 Free and closed 3D volume with 8 nodes contained in a closed volume subject to Dirichlet boundary conditions.

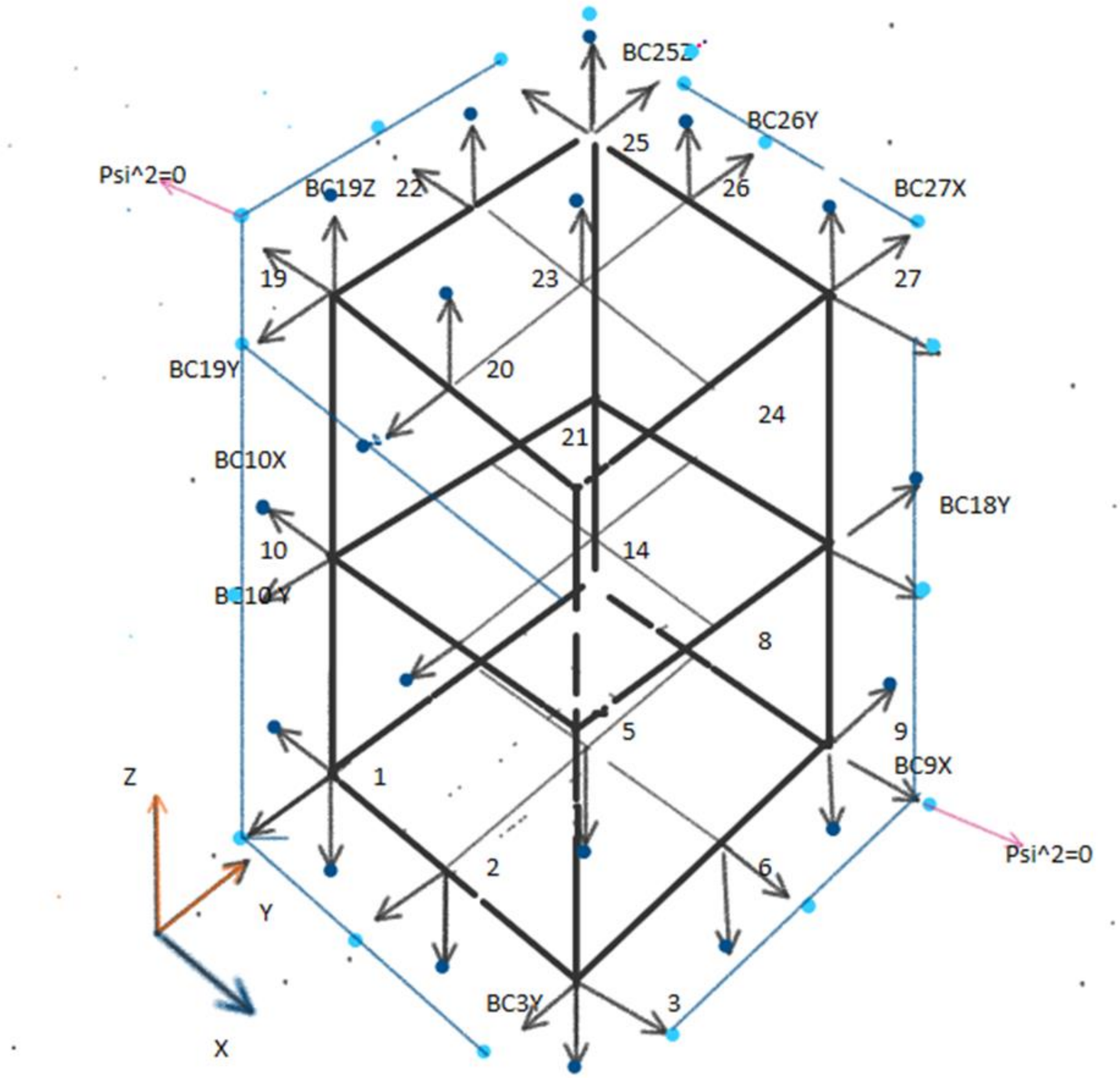

Fig. 2. Closed 3D volume with 27 nodes contained in a closed surface subject to Dirichlet boundary conditions.

Knowing the number of dimensions of the system (1D, 2D, 3D geometry), the number of free nodes n and RO will strictly define *the structure and constitution of the statistical transition matrix Bnxn.*

Obviously, as n increases, the resolution and accuracy increase.

Below, in Section III, we briefly explain what the statistical theory of Cairo techniques is and how it can be applied to generate revolutionary new mathematics and physics [8-15].

*We remind once again that **a mathematician who does not master the universal laws of physics is not qualified to conduct mathematical research.***

As a result, we assume that neither E. Schrödinger nor N. Bohr understood physics and that Bohr/Copenhagen's interpretation of the Schrödinger equation in 1927 was a kind of disaster.

None of them correctly understood the universal laws of physics and the result is that the Schrödinger equation with the Bohr/Copenhagen interpretation of 1927 is somewhat disastrous.

There are many interpretations of the classical Schrödinger PDE in 1927 that are still the subject of serious debate, although their ability to predict experimental events generally leads to the same result.

The most commonly accepted are the simple Bohr/Copenhagen approach and the multi-universe approach, where the prediction is ultimately a statistical result attributed to different processes.

However, the author proposes another interpretation of Schrödinger's partial differential equation, based on the new mathematical techniques of Cairo's statistical theory.

We hope that the author's interpretation will soon be completed and published and that it will be closer to the

parallel multi-universe interpretation rather than the incomprehensible Bohr/Copenhagen one.

The author's interpretation, simpler and more understandable than the two previous ones, is based on the assumption of the existence of a complex transition matrix and a transfer matrix Q,D* for the quantum system, defined as follows:

Q=√B . . . . (1)

The author assumes that equation 1, when properly analyzed, can introduce a more complete and accurate interpretation of Schrödinger's PDE which will be the subject of the next article.

Where B is the real transition matrix for diffusion PDEs such as thermal conduction.

Once again, the quantum transition matrix Q is a wave equation and, when reduced, it reduces to the diffusion equation.

We also assume that the quantum transition matrix function Q can be determined by analogy with the transfer matrix of the real system B.

where B is the transition matrix well known in the theory of Cairo techniques.

Illustrative examples are presented in Section III, Applications and Numerical Results.

III.Applications and Numerical results

In this section, we explain in more detail the theory and applications of how to generate new mathematics in the form of questions and answers covering different areas of physics and mathematics.

Q1

Is it true that if Q=√B then Q+Q^2+Q^3 ..=√[B+B^2+B^3...]?

A1

This is a serious question, because it provides a proof of the correctness of the rules and theorems 2 to 8 provided by the author.

Now, if B is the transition matrix of the real scattering system and Q=√B that of the complex quantum system, then the sum of the matrix power series:

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

which is equal to the transient transfer matrix of the real system. D(N) at time t=Ndt is in fact the solution of the PDE in classical physics.

Similar analysis goes for the transient transfer matrix of quantum complex system:

D*(N)=Q+Q^2+Q^3...+Q^N . . . . . (3)

For a sufficiently large time t=Ndt, we obtain the time-independent steady state D*, expressed by:

D*(N goes to infinity)= 1/[1-B] . . . . (4)

Even for a sufficiently large number of iterations jumps N,

Q+Q^2+Q^3...+Q^N . . . . (5)

Indeed, only about twenty terms of the 5 series are considered adequate as a sufficiently large time t=Ndt, and we obtain the time-independent stationary state D*, expressed by:

D*(N)= 1/[1-Q] . . . . (6)

for a sufficiently large number of iterations jumps N.

Now consider the transfer matrices

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

and

D*(N) = Q+Q^2 +Q^3...etc.

Let us now consider the special case of 8 equidistant nodes in a 3D cube shown in Figure 1, without loss of generality,

The simplest real transition matrix B 8x8 appears for RO = 0.

Using the statistical theory of Cairo techniques [1, 2, 3], the transition matrix B should be given by:

B 8x8

0	1/6	0	1/6	1/6	0	0	0
1/6	0	1/6	0	0	1/6	0	0
0	1/6	0	1/6	0	0	1/6	0
1/6	0	1/6	0	0	0	0	1/6
1/6	0	0	0	0	1/6	0	1/6
0	1/6	0	0	1/6	0	1/6	0
0	0	1/6	0	0	1/6	0	1/6
0	0	0	1/6	1/6	0	1/6	0

This is a true transition matrix, capable of solving any general partial differential equation in classical and quantum physics, and of generating new mathematics.

To calculate the transfer matrix of the real system D(N), such as the PDE by heat diffusion, and that of the quantum system D*(N) generated by the Schrödinger equation, we use their respective definitions by the complete matrix series (Eq. 2, 3):

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

and,

D*(N)=Q+Q^2+Q^3+ . . .+Q^N

For a sufficiently large value of N, we obtain the **time-independent** stationary solution given by:

D=1/(1-B)

D*=1/(1-B*)

By analogy with the rarely mentioned infinite geometric series:

X+X^2+X^3+. . . . X^N=1/(1-X) . .. . **(7)**

as N tends to infinity.

It is clear that the matrices B, Q, D, and D* are all doubly symmetric.

It should be noted that to date, we only know of two types of transition matrices:

the i-Markov transition matrix

the transition matrices ii-B and Q, derived from the statistical theory of Cairo techniques, which are far superior.

The actual 8x8 transfer matrix D for diffusion systems is easily found using the relationship 5,6:

D = [1/(1-B)-I] . . . . .(7)

For a sufficiently large number N.

Where I is the unit matrix.

The 8x8 transfer matrix D in Figure 1 is given by:

D=

11/105 22/105 8/105 22/105 22/105 8/105
4/105 8/105

22/105 11/105 22/105 8/105 8/105 22/105
8/105 4/105

8/105 22/105 11/105 22/105 4/105 8/105
22/105 8/105

22/105 8/105 22/105 11/105 8/105 4/105
8/105 22/105

22/105 8/105 4/105 8/105 11/105 22/105
8/105 22/105

8/105 22/105 8/105 4/105 22/105 11/105
22/105 8/105

4/105 8/105 22/105 8/105 8/105 22/105
11/105 22/105

8/105 4/105 8/105 22/105 22/105 8/105
22/105 11/105

In contrast, the complex 8x8 transition matrix Q for quantum mechanical systems is easily found using the relation:

Q=√B . . . . . (8)

And then we find the complex transfer matrix D* from eq 5.

It follows that D* 8x8 is expressed as follows:

((1+i)*2^0.5+(1+i)*6^0.5)/16 ((3-3i)*2^0.5+(1-i)*6^0.5)/48
((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48
((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((1-i)*2^0.5-(1-i)*6^0.5)/16
((3+3i)*2^0.5-(1+i)*6^0.5)/48

((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((1+i)*2^0.5+(1+i)*6^0.5)/16 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((1-i)*2^0.5-(1-i)*6^0.5)/16

((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((1+i)*2^0.5+(1+i)*6^0.5)/16 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((1-i)*2^0.5-(1-i)*6^0.5)/16 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48

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((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((1-i)*2^0.5-(1-i)*6^0.5)/16 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((1+i)*2^0.5+(1+i)*6^0.5)/16 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48

((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((1-i)*2^0.5-(1-i)*6^0.5)/16 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((1+i)*2^0.5+(1+i)*6^0.5)/16 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48

((1-i)*2^0.5-(1-i)*6^0.5)/16 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((1+i)*2^0.5+(1+i)*6^0.5)/16 ((3-3i)*2^0.5+(1-i)*6^0.5)/48

((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((1-i)*2^0.5-(1-i)*6^0.5)/16 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((3+3i)*2^0.5-(1+i)*6^0.5)/48 ((3-3i)*2^0.5+(1-i)*6^0.5)/48 ((1+i)*2^0.5+(1+i)*6^0.5)/16

Or,

The complex D*(N) is expressed by

D*(N)=

((105+35*i)*2^0.5+(63+45*i)*6^0.5+928)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5-(63-45*i)*6^0.5+32)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840

((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5+(63+45*i)*6^0.5+928)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5-(63-45*i)*6^0.5+32)/840

((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5+(63+45*i)*6^0.5+928)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105-35*i)*2^0.5-(63-45*i)*6^0.5+32)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840

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((105-35*i)*2^0.5-(63-45*i)*6^0.5+32)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5+(63+45*i)*6^0.5+928)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840

((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5-(63-45*i)*6^0.5+32)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5-(21+15*i)*6^0.5+64)/840 ((105-35*i)*2^0.5+(21-15*i)*6^0.5+176)/840 ((105+35*i)*2^0.5+(63+45*i)*6^0.5+928)/840

It can be easily shown that D*^2=D or D-D*^2=zero matrix which proves the statement of the question.

We claim here that the answer we have given to the question of the summation of power series, among others, clearly shows that the rules applicable to infinite geometric series also apply to infinite matrix series, and vice versa

Hereafter we present some properties of the matrices D and D*:

i- Both D and D* are doubly symmetric matrices.

i- The solution to the real diffusion equation, like the PDE for heat, is given by:

U(x,y,z,t)=D.[BC+S] + B^N .IC . . . . . (8)

iii- The solution to the quantum Schrödinger PDE is given by:

U*(x,y,z,t)=D*.[BC+S] + Q^N .IC* . . . . . (9)

U and U* are the energy density in the real system and the quantum system, respectively.

[Note: If you are not familiar with the universal laws of physics, please stop reading this answer is not for you.

iv- Multiplying the real transfer matrix D or the complex transfer matrix D*(N) by the vector [11111111], we obtain the same result:

A real vector, which is the Rayleigh constant calculated at 3.414214,

then allows us to calculate the universal constant π at 3.14159

We assume this is the first time that π has been calculated with six-digit precision according to the rules of classical physics and/or quantum mechanics.

The author believes that neither classical nor quantum physics can be understood in the current, incomplete R^4 space.

Is this the reason why neither E. Schrödinger nor N. Bohr understood physics?

Einstein, Schrödinger, Heisenberg, Minkowski, Hilbert, Rieman, among others, overcomplicated the theory of mathematics and the theory of physics, both classical and quantum, simply because they did not define the time t woven into the 3D geometric space to form the 4D unitary space xyzt.

Q2

What is the definition of force?

A2

Google search: "In physics, force is an unopposed interaction that changes the motion or shape of an object. It is a vector quantity, meaning it has both magnitude (size) and direction."

The Cauchy stress tensor T describes the stress state at a point in a deformed material by relating the force acting on any surface passing through that point to the orientation of that surface. It is a second-order tensor with nine components that represent the normal and shear stresses on the internal surfaces of the material. According to the Cauchy stress tensor theorem T, these components allow the calculation of the stress vector on any arbitrary plane passing through that point.

T3x3=

Fxx Fxy Fxz

Fyx Fyy Fyz

Fzx Fzy Fzz . . . . . (10)

However, the statistical theory of Cairo techniques introduces the 4D unitary stress tensor xyzt, defining time as a dimensionless integer N, and generalizes the Cauchy tensor to T* as,

T*4x4=

Fxx Fxy Fxz Fxt

Fyx Fyy Fyz Fyt

Fzx Fzy Fzz Fzt

Ftx Fty Ftz Ftt . . . . . (11)

This new space and new definition of force provide revolutionary rules for classical physics and quantum mechanics as well as for mathematics.

The question arises: is it time to demolish quantum mechanics and physics in the old geometric space?

The theory of relativity and Schrödinger's partial differential equation are the newest science and therefore should be the clearest and most precise, but unfortunately it is the opposite.

In this article, we apply the concept of volume control and its physical entanglement to better describe and understand the two theories.

The mutual orthogonality of x, y, z, t can only be found in the physical space called 4D unitary x-t space where time t is properly defined as a dimensionless integer N woven into the geometric space x y z and t = ndt where dt is time step or jumping in time.

Note that classical mathematical spaces R^4 with real time t as external controller such as Minkowski, Hilbert, Rieman. . . etc are all incomplete because they do not satisfy the condition of mutual orthogonality of x, y, z, t.

Schrödinger space may or may not be complete.

The Heisenberg matrix space is neither statistical nor complete.

Only recently, in 2020, a new well-defined unitary 4D xt space appeared called Cairo Technique Control Space, which provides efficient solutions to all physics and mathematics problems such as the six problems stated above.

We assert here that the Cairo techniques and its statistical chains of matrix B strongly depend on the numerical value of the main diagonal entries called RO ∈ [0,1].

A specific topic of this article is how to correctly choose RO ∈[0,1] corresponding to a specific situation in classical physics, quantum physics or mathematical integration related to the above six problems.

Finally, it should be noted that the purpose of this article is not to underestimate the great achievements of the brilliant Einstein, Schrödinger, Heisenberg, Minkowski, Hilbert, Rieman, among others, but to address the main flaws of their theories, if applicable.

This mutual orthogonality of x, y, z, t can only be found in the physical space called 4D unitary x-t space where time t is properly defined as a dimensionless integer N woven into the geometric space x y z and t = Ndt where dt is the time step or jump in time [3,4,5,6,7,8].

The question arises, what is the difference between the concept of control volume in R^4 space and 4D unitary space?

1-The 4D x-t unitary definition of the control volume is a new approach that suggests a new perspective on control volumes and their role in modeling physical systems, particularly in the context of unified field theory and quantum mechanics.

In fact, it is not just an approach but a new, comprehensive and well-established theory (as of 2020) that replaces current incomplete mathematics and physics in R^4 space with t as controller external.

2-The idea of extending the concept of control volume from {R} ^4 (3D space + time) to a more structured 4D x-t unitary control volume called Cairo techniques and matrix space B imports a richer mathematical framework to describe classical and quantum phenomena [7,8,9].

What specific characteristics make the Cairo techniques and matrix space B a complete universal space?

* A. Einstein is considered the pioneer of the 4D x-t unit space in his theories of SR and GR

He discarded the space of R^4 because he considered it incomplete.

Unfortunately, the giant Einstein did not find the time or the tools (computers) to move forward and correctly define time.

(Note that our universe is made up of space, time and energy density.)

In Cairo's theory of techniques, time itself is considered a dimensionless integer embedded in the three-dimensional x, y, z space.

A surprising result is that simply multiplying the two matrices M1.M2=I alone constitutes Einstein's general relativity in one step.

By multiplying the Cauchi matrices/tensors by the curvature matrix and equating the multiplication by I, the unit matrix, we get,

∇^2xx ∇^2xy ∇^2xz ∇^2xt] U(x,y,z,t)

∇^2yx ∇^2yy ∇^2yz ∇^2yt] U(x,y,z,t)

∇^2zx ∇^2zy ∇^2zz ∇^2zt] U(x,y,z,t)

∇^2tx ∇^2ty ∇^2tz ∇^2tt] U(x,y,z,t)

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X

Cxx Cxy Cxz Cxt

Cyx Cxy Cxz Cyt

Czx Czy Czz Czt

Ctx Cty Ctz Ctt

= I . . . . (12)

Where ∇^2xx U(x,y,z,t) replaces Fxx and ∇^2xy U(x,y,z,t) replaces Fxy, . . etc.

C is the curvature tensor.

Equation 12 above constitutes the theory of general relativity on its own, and it is far superior to Einstein's theory for many reasons.

The question now is why mathematicians and physicists don't address the revolutionary rules and theorems arising from four-dimensional xyzt space.

It is now the science deniers who decide the scientific questions and the answers!

Q3

How can we deduce the special theory of relativity from the general theory of relativity?

A3

It can be shown that the special theory of relativity is only a special case of the general theory of relativity. 4-I.Abbas.

This question is answered in detail in Reference 4 The Theory of Everything, IJG, October 2025 and there is no gain or progress in repeating it.….

Q4

How to solve an arbitrary system of n simultaneous linear algebraic equations?

A4

It can be shown that the real transfer matrix Dnxn can solve any arbitrary system of n linear algebraic equations.

For example, we present the solution to the following nine arbitrary linear algebraic equations (without loss of generality:

Step 1

The B transition matrix fo 2D square and 9 equidistant nodes is given by,

0	1/4	0	1/4	0	0	0	0	0
1/4	0	1/4	0	1/4	0	0	0	0
0	1/4	0	1/4	0	1/4	0	0	0
1/4	0	0	0	1/4	0	0	1/4	0
0	1/4	0	1/4	0	1/4	0	1/4	0
0	0	1/4	0	1/4	0	0	0	1/4
0	0	1/4	0	0	0	0	1/4	0
0	0	0	0	1/4	0	1/4	0	1/4
0	0	0	0	0	1/4	0	1/4	0

Step 2

The I-B matrix is expressed as,

1	-1/4	0	-1/4	0	0	0	0	0

-1/4	1	-1/4	0	-1/4	0	0	0	0
0	-1/4	1	-1/4	0	-1/4	0	0	0
-1/4	0	0	1	-1/4	0	0	-1/4	0
0	-1/4	0	-1/4	1	-1/4	0	-1/4	0
0	0	-1/4	0	-1/4	1	0	0	-1/4
0	0	-1/4	0	0	0	1	-1/4	0
0	0	0	0	-1/4	0	-1/4	1	-1/4
0	0	0	0	0	-1/4	0	-1/4	1

Step 3

The E transfer matrix is given by, E=1/(I-B)

E=

551/457 188/457 68/457 188/457 133/457 60/457
24/457 96/457 39/457

3/7 19/14 3/7 5/14 4/7 2/7
1/14 2/7 1/7

772/31991544/3199 4020/3199 1544/3199
1384/3199 1504/3199 236/3199 944/3199 612/3199

1261/3199 1845/6398 533/31998243/6398
1896/3199 766/3199 887/63981774/3199 635/3199

855/31991710/3199 988/31991710/3199 4997/3199
1732/3199 510/31992040/3199 943/3199

456/3199 912/31991380/3199 912/31991812/3199
4336/3199 272/31991088/3199 1356/3199

276/3199 552/3199 1172/3199 552/3199 760/3199 604/3199
3532/3199 1332/3199 484/3199

332/3199 664/3199 668/3199 664/3199 1656/3199 912/3199
1096/3199 4384/3199 1324/3199

197/3199 394/3199 512/3199 394/3199 867/3199 1312/3199
342/3199 1368/3199 3869/3199

Step 4

Finally the D transfer matrix is subject to,

D=E-I

Therefore, D=,

94/457 188/457 68/457 188/457 133/457 60/457
24/457 96/457 39/457

3/7 5/14 3/7 5/14 4/7 2/7
1/14 2/7 1/7

772/3199 1544/3199 821/3199 1544/3199 1384/3199
1504/3199 236/3199 944/3199 612/3199

1261/3199 1845/6398 533/3199 1845/6398
1896/3199 766/3199 887/6398 1774/3199 635/3199

855/3199 1710/3199 988/3199 1710/3199 1798/3199
1732/3199 510/3199 2040/3199 943/3199

456/3199 912/3199 1380/3199 912/3199 1812/3199
1137/3199 272/3199 1088/3199 1356/3199

276/3199 552/3199 1172/3199 552/3199 760/3199 604/3199
333/3199 1332/3199 484/3199

332/3199 664/3199 668/3199 664/3199 1656/3199 912/3199
1096/3199 1185/3199 1324/3199

197/3199 394/3199 512/3199 394/3199 867/31991312/3199 342/3199 1368/3199 670/3199

The D matrix is the required solution of any 9 simultaneous linear algebraic equation system expressed as,

a11.x1 +a12 .x2 +a13 . x3 + . . . +a19 .x9 =b1

a21.x1 +a22 .x2 +a23 . x3 + . . . +a29 .x9 =b2

. . . .

. . . .

a91.x1 +a92 .x2 +a93 . x3 + . . . +a99 .x9 =b9

Surprisingly, multiplying the matrix Dnxn by the vector b yields the desired solution [x1,x2,...x9]

without resorting to classical methods such as matrix inversion, triangulation, iteration techniques, etc.

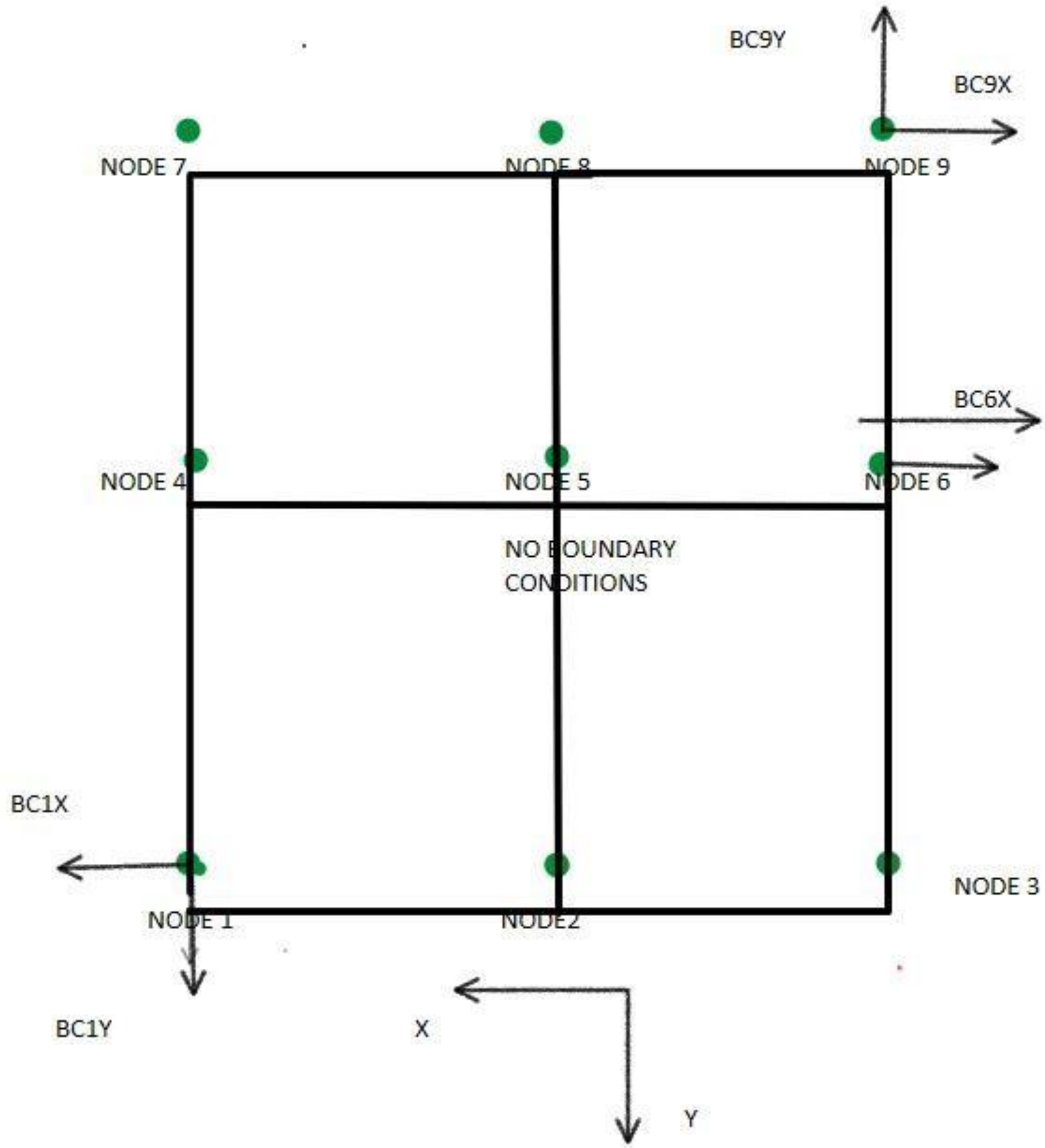

Fig.4. A 2D square discretized in 9 equally spaced free nodes subject to Dirichlet BC in general case.

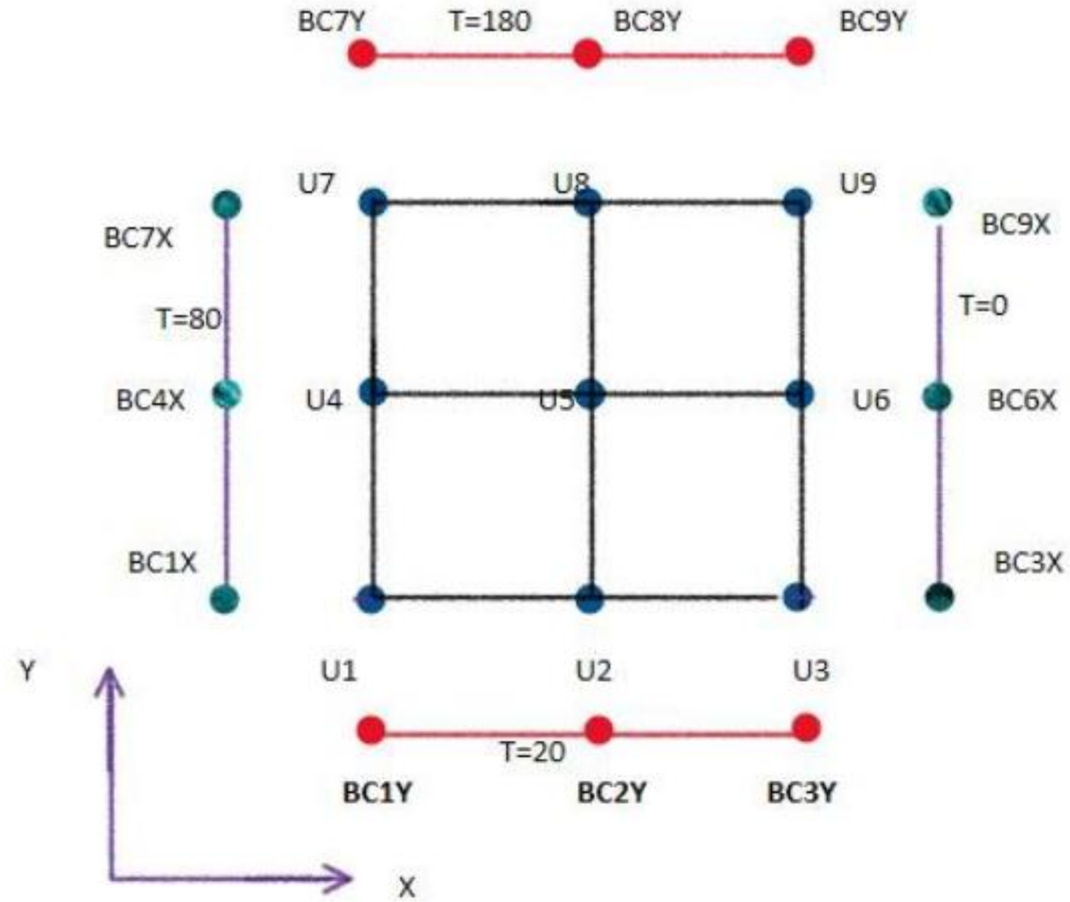

Figure 2. 2D xy shape discretized into 9 equally sp
free nodes.

Fig.4b.Dirichlet boundary conditions are specified [From Ref 18,19]

Consider a 2D square discretized in 9 equally spaced free nodes subject to Dirichlet boundary conditions as shown in Fig.4.a,b.

Q5

Can we combine the Bohr interpretation and the many-worlds interpretation to get the complete interpretation?

A5

The author assumes that the Bohr interpretation and the many-worlds interpretation can be combined to obtain the complete interpretation. Moreover, the secret of this combination lies in the established equation proposed by the author:

$Q=\sqrt{B}$ This will be the subject of the next article.

IV. Conclusion

Nothing in science is FINAL, which is why science is called a self-correcting subject.

This means that it is more or less possible that Albert Einstein, Erwin Schrödinger and other great scientists did not complete their work perfection.

The mutual orthogonality of x, y, z, t can only be found in the universe physical space called 4D unitary x-t space where time t is properly defined as a dimensionless integer N woven into the geometric space x y z and t = Ndt where dt is the jump time.

Classical mathematical spaces R^4 such as Minkowski, Hilbert, Rieman. . . etc are all incomplete because they use the real scalar time as external controller and do not satisfy the above condition.

The space called Cairo techniques and B-matrix statistical chains can further provide statistical proof or statistical refutation to any well-defined and time-dependent scientific hypothesis.

In this article, we have investigated the top five unanswered questions in R^4 space and provided key answers to major issues related to the construction of physical matrix/tensor in classical and quantum physics.

Finally, it should be noted that the purpose of this article is not to underestimate the great achievements of the great Einstein, Schrödinger, Heisenberg, Minkowski, Hilbert, Rieman, among others, but to address the main flaws of their theories, if applicable.

NB. The author uses his own double precision algorithm like that of references 21,22,23,24.

No Python or MATLAB algorithms are needed.

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