Physics the Philosophy of Mathematics

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Abstract

Mathematics describes the logic of numbers while physics explicitly explains the laws of nature, yet somehow these separate disciplines appear eternally and intrinsically related. We can not describe nature without referencing physics and we cannot describe physics without introducing mathematics. Are these distinct constructs derived from a similar study "the logic of nature", or is this a coincidental aspect of nature's mystery? In this paper I will discuss the motivation of applying mathematics to physics and argue its cohesive interplay in guiding our investigations of nature.

1. Introduction

Imagine your conscious mind immersed in an augmented virtual reality video game. The rules of the game curates strict parameters by which the game is played. Many of the laws permitting advancement to the next level may appear disguised as hidden treasures set for conquest, but rest assured, every player can achieve advancement from the knowledge obtained in a persistent process of trial and error (mostly by error). If this concept appears reminiscent of a horrid science fiction movie you have already seen, you have not thoroughly contemplated the mathematical labyrinth in which reality is permanently submerged. Physical reality, as we know it, is encapsulated in a confined web of mathematical laws described as physics.

Why should we care about the relationship of mathematics and physics? Our very existence is structured from a calculated algorithm operating inside a matrix of infinite possibilities. Our DNA molecules, vast and complex, must obey the same mathematical laws governing the movement of the stars and planets procured in the heavens above. Throughout human evolution we have learned nature speaks quietly in the delicate language of beautiful mathematics. This reality is so powerfully subtle; our conscious minds are often disillusioned into believing we possess a sovereign will to do as we wish without it. This bogus sense of certainty is apparently the guise of a talented unseen puppet master carefully wielding the known laws of physics held sacred by mathematicians collectively.

2. What is Mathematics and Physics?

Mathematics represents who we are and manipulates what we will become. What is regarded as an unpredictable destiny is derived from the calculable probabilities persuaded by a specified range of distinct variables. For example love; is it the fortune of fate that brings two distant lovers into a delightful physical embrace of one another, or is it a pattern of presumptive logical sequences controlled by a probabilistic array of options derived from a shared algorithm suggesting two individuals behave in accordance with a defined mathematical function as modeled and recalled? In other words, are these lovers simply performing a stored mathematical sequence within an equation of variable probabilities or did they choose to randomly fall in love. This is without a doubt a terrifying notion to most, but we must accept this physical reality as truth in an effort to consider fact from the fictional delusional of free will without calculable mathematics exercised in the physical reality described as physics.

Historically, every new branch of mathematics often leads to a notable theoretical revelation in physics. The algebraic method of calculating conservation in an equation represented by Archimedes and

Galileo was advanced in Classical Physics by Newton's discovery of calculus. This triumphant discovery was further advanced by introducing geometry into calculus. Einstein used Lorentz transformations to describe Special Relativity and employed Ricci Tensors in a space-time field to described General Relativity. Moving forward, Quantum Mechanics and the Standard Model of particle physics introduced probability and gauge mathematics. Finally, at the precipice of new discoveries, "The New Standard Model" interpreted physics using dimensional mathematics. It is an apparent aspect throughout human evolution, the innovation and advancement of human technology depends on a precise interpretation of mathematics applied to our theoretical understandings of physics.

3. The Philosophical Debate

The sole application of physics is the precision of analytically measuring objects and events. Physics relies on the consistency of mathematics to describe the physical attributes of objects and their relative locations during an event. Mathematics is used as a tool to then communicate and offer validity in the description of physical objects and events using equations consisting of numbers, symbols, and logic just as language is used to communicate thoughts, ideas, and occurrences using words consisting of letters, punctuation, and grammar. Due to our knowledge of mathematics, we are able to arrange adequate equations necessary in describing and predicting reality accurately. Therefore, the logic prescribed in arranging these mathematical constructs into a philosophy of verifiable laws is regarded as physics.

Philosophy was developed to discern verifiable facts from fiction using the logic of deductive reasoning. Some facts appear conclusive and self evident while others appear uncertain and probabilistic. The approach by which we derive a proof is in essence an art requiring skill, deep intuition, and a viable interpretation of facts leading to an established and advisable theoretical motivation. Through this development of logically theorizing we may also obtain an unfortunate shroud of abstract methodologies. It is only through the guide of human intuition that we possess the ability to confidently derive a meaningful interpretation.

Is mathematics an abstract of reality or is reality an abstract of mathematics? A skilled artist can depict an accurate interpretation of reality, but with imagination, the artist can also create an abstract perception of reality. Abstractions in physics derive illusions of reality which are falsifiable misconceptions derived from a measured departure of calculable reality, hence provoking a chaos of fantasy. Nevertheless we must begin with speculation and derive a truthful resolve using the philosophy of mathematics in physics. As you will soon discover, even an abstract perception may hold true according to a particular perspective unique by the position of observation.

4. Logical Reasoning

What is the purpose of nature's pursuit in the evolution of intelligent life? Perhaps it was nature's way of allowing the universe the ability to observe and contemplate the beauty of self. Life is simply the experience of existence from a solace of nonexistence and nothingness. Let us begin our discovery with two numbers theoretically regarded as nonexistent, zero and infinity - the alpha and omega of existence. If zero is nothing and therefore does not exist because it does not initiate, and infinity is everything, and therefore does not exist because it does not terminate, we may then logically assume these two abstract concepts maintain a related proposition and therefore are compatible in a defined equilibrium according to a particular observable superposition or perspective. We may use mathematics to represent this vague relationship between zero and infinity.

$$0 = \infty - \infty$$

How can something derive from nothing? If everything is derived from nothing, then something is ultimately nothing when deduced. For the sake of brevity, I will not explore this argument further; however this logical approach towards reasoning, whether infinity and zero are aspects of a single reality, is not an absurd notion when we apply logical reasoning to mathematics. We find our initial interpretation often projects an abstract perception, a concept void of reason which is falsifiable once appropriately examined and argued. If however we find a fatal flaw within our deductive reasoning, we must investigate this concern expeditiously to resolve an existing core of truth.

5. An Application in Developing Proof

Albert Einstein is regarded by many as the most influential theoretical physicist to have ever lived, yet his approach to solving the mysteries hidden in nature were always initially resolved through a philosophical intuition guided by the logic of pragmatic reasoning. Eventually he would substantiate his proposed arguments with the mathematical proofs necessary to support every initial claim. It is important to mention, providing a mathematical proof without offering a cohesive interpretation is a useless endeavor in understanding the physics of nature. Furthermore, the preferred process is obtained by contemplating a philosophical conjecture followed by a provable mathematical interpretation by which the unknown prospective outcome can be experimentally tested and presented as vindicating evidence. If we attempt to interpret a mathematical interpretation without the motivation of a philosophical conjecture or interpret evidence in an experiment a priori, we risk misinterpreting the mathematical derivation. For example, we may deterministically use the equilibrium of a simple equation to define the postulates needed to interpret the conservation laws of energy or we may use an inequality to represent a range of probabilities and therefore offer a postulate of uncertainty. These concepts are rooted in the introduction of basic arithmetic taught to young preschool children, yet they are the pinnacle motivation behind describing Relativity and Quantum Physics taught to graduate students seeking a doctoral degree in physics from an elite established university. What truly separates these different levels of intuitive understandings is a philosophical concept known to human experience, assigning a value or definition to an object or event is either relative or uncertain and therefore probabilistic at best.

Einstein understood this conjecture, but also suggested these ideas of uncertainty were incomplete. The theory I have proposed introduces a complete theory concerning perspectives. As Einstein suggested, the laws of the universe are relative, but relative to what? The complete postulate will suggest the universal laws are relative to the perspectives of the observer. In other words, beauty is in the eye of the beholder. Objectivity is subjective according to perspective. This idea has brought upon the advancement of new understandings regarding space-time dimensions and the realities of our physical universe. Akin to Einstein's philosophy of physics, these ideas appear to only propose an intuitive philosophical conjecture, but with the correct interpretation of mathematics, we may prove these laws truly exist in scope and are a valid aspect of reality capable of being resolved experimentally.

To objectify an object we must first define it. This is the initial purpose of an equation, to figuratively define an abstract object in terms which may appear quantifiably valid. Einstein used a quantum of light and referenced the displacement of its propagation c (the transverse speed of light in a vacuum) in terms of velocity to derive Special Relativity. His first postulate suggested the principles of relativity. It stated the laws of physics were invariant (identical) in all reference frames. To prove this he needed to declare objectivity, the quanta of light, which led to a claim supported in his second postulate, the principle of an invariant light speed. The speed of light was considered constant in all reference frames. The purpose of introducing these postulates was principally aimed at offering a contradiction in objectivity. Einstein wanted to prove the laws of physics did not conform to an absolute objective state regardless of conforming to an invariant frame of reference. The propagation of an object at rest is not zero (remember zero technically does not exist), but it is relative. From this motivation Classical Physics, as interpreted by Newton, was replaced with Einstein's Relativity.

We may ask how two separate ideas can conform to the same principle, if individually they are mathematically correct, but represent different intuitive conclusions. The short answer is an interpretation by perspective. Einstein revised Newton's theory on gravity using a different set of equations represented by an additional branch of mathematics (calculus and geometry). These equations, in many cases, may yield the same answer, however with Einstein's revised interpretation, guided by his unique intuitive philosophical approach, he produced the precision of accurate results. In comparison, the Newtonian representation of gravity is regarded as a vague abstract approximation of reality once compared to Einstein's General Relativity. It is through this evaluation of precision measuring that we derive a distinct departure from accuracy, thus allowing Newton's version of interpreting a physical phenomenon known as gravity to be regarded as incorrect.

In reality, we confront approximations in probabilities often, but we must not hastily confuse their distinct definitions. Probabilities derive approximations from a range of distinct possibilities; this can not be stated otherwise. For example, it is probable the roll of a six sided die will land on one side of a die and display a number from 1-6. However, It will not display a rational approximation randomly (i.e. 3.5). To assert this phenomenon as a valid outcome is a poor interpretation of mathematical and physical reality. To this Einstein stated, "God does not play dice". Appropriately we may ask how we can consistently derive a correct deterministic solution from a range of variable possibilities. We may allow the observer the ability to view the roll from a different perspective. Using a range of perspectives will also offer a different interpretation. Is this cheating?

6. Introducing Perspectives

Suggesting an observer must remain restricted to a fixed absolute frame of reference violates the postulates derived in Special and General Relativity. The position of neither an object nor observer is absolute just as its relative velocity and trajectory is not. In geometry we assign direction in a prescribed convention without any disregard for appropriation. What if we algebraically assign variables relative to any perspective? Will our laws of reality change? On earth our laws of physics are guided by an unseen prejudice, gravity. Due to gravity we assume a prescribed notion of up and down, however in empty space, we can not uniformly determine direction or distance without objectively agreeing to an absolute reference frame and specific gauge symmetry. If we roll a die in space, we can not determine which end will face up because our interpretations of up includes a perspective prejudice. Nature does not consider these prejudice assumptions correct in any reference frame, they remain true and unique only to an observer's perspective. Therefore, using Perspective Theory, we offer an observer at rest an infinite number of available perspectives or reference frames. The displacement of an object in a particular trajectory is displaced in a defined gauge dimension relative the position of an objective observer or field. The principles and invariant laws of physics are applicable only to a particular observer's perspective. These laws may geometrically transform respectively, but they do not share identical solutions because they may not share an identical frame of reference or perspective.

Now that I have explained a philosophical motivation in physics for perspectives, how do we express or represent this mathematically? We may define the displacement of an object in multiple transverse frames. If an object's gauged field dimensions (volume) is represented by its density ρ, we may describe its displacement in x multiples of ρ or $\Delta\rho$. This method of propagation suggests the defined displacement ρ remains constant in transverse propagation (excluding physical transformations of the object from fission or fusion by collision); however to a stationary observer this length will appear to contract during displacement according to the transformation laws of relativity. This observation is an abstract perception due to the relative propagation of an object and its observer.

A dimension is a directional gauge field in space just as the trajectory is a declared path in a spatial field. Mathematically we use exponents to describe the dimension an object propagates in. An object may propagate in infinite dimensions simultaneously (i.e. an explosion or implosion) or propagate in a relative perspective. A relativistic observer at rest can reference an infinite number of potential perspective dimensions simultaneously. Therefore when an object propagates in a particular dimension relative a propagating observer, we may define the relative trajectory of propagation by a valence dimensional variance.

$$\Delta\rho^{m-n} \approx \frac{\rho^m}{\rho^n}\gamma$$

Furthermore the interpretation of a change in density initiated by propagation or fragmentation is mathematically represented differently, but may yield a similar conclusion assuming v=m.

$$\rho \pm \rho' = \frac{m}{V}(v \pm v') \neq \frac{v}{V}(m \pm m') = \Delta p$$

It is only when we apply an objective divergent perspective frame are we able to achieve a clairvoyance of clarity regarding the correct interpretation of the system. One system depicts linear Quantum Mechanics and the other non-linear Quantum Dynamics. In a dynamic system, the interpretation must declare fragmentation of a conjoined density flux or the divergence of a conjoined density flux within a hyper-field gradient.

$$\rho \pm \rho' = \frac{m}{V}(v \pm v') \neq \frac{dy}{dx}\frac{v}{V}(m \pm m') = \nabla\Delta p$$

Just as we can not assume an absolute (zero) rest frame in regards to the displacement of an object due to relativity, we can not assume an absolute position in space and determine its trajectory due to perspectives. We may only consider the convergence or relative divergence of these aspects within a gauged field gradient. Therefore a relative field perspective is appropriately applied in a hyper-field gradient to determine the position and definition of an object or event in physical reality.

This is a small introduction of the work I have introduced in the overall scheme of a "New Standard Model", but it provides the motivation behind the misguided interpretations contained in Quantum Mechanics and Particle Physics. Quantum Mechanics describes the divergence of a converged quantum object within a specific gauged field gradient, while Particle Physics describes the fragmentation of the converged quantum object. Quantum mechanics appears probabilistic because it attempts to identify the fixed trajectory of a gauged particle density within the perspective of an infinite field gradient. Particle physics appears uncertain because it attempts to identify an infinite density derivative or particle fragment from the initial density of a defined gauge particle due to a collision. This crucial distinction is verifiable only through the correct interpretation of perspectives. The mathematics may appear to yield similar density conclusions, but the correct interpretation introducing perspectives is an additional advancement in achieving an accurate definition and depiction of reality. The relevance in applying a mathematical representation to a philosophical conjecture is to provide the distinction of a proof of truth, however it is in the in the idealized interpretation of this mathematical representation we find a correct solution in a conclusion or a biased opinion based on subjective objectivity. This is the philosophy of mathematics that describes physics.

7. Conclusion

I will not delve further into the field of perspective study, as this is not the motivation for this paper; however it clearly identifies the power of this cordial relationship between mathematics and physics provided through the logical interpretation and philosophical intuition of reality itself. In the discovery of new laws embedded into the fabric of reality, we may as a guide, use our philosophical intuitions and mathematical prowess to derive physics. We have proven, by our known experience by experimentation, our destiny is predictable, programmable, and provoked by the laws of mathematics. We are all under the mercy of mathematics when we assert free will, but our knowledge of manipulating these laws within the physical realm, based on our understandings of physics, may help manipulate the inevitable coercion dictated by these laws. We must however, at every moment, apply our knowledge of mathematics to deceive the inevitable outcome of a preordained result. Whether we accept it or not, mathematics and physics are permanent aspects of our reality. Mathematics is inescapable throughout our infinite and eternal universe. Before birth and beyond death our existence remains bound to the inevitable laws of this physical realm we describe in the laws interpreted and understood from the logic of physics represented in the scaffolding of mathematics. It is only during the span of a human lifetime, we individually possess the ability to combat the systematic procurement of external influences and pave a defiant path towards a chosen destination in an effort to find a pursuit of "happiness" (or a preferred state) as we individually define it from our unique perspectives. This is the only purpose we are granted in life itself; perhaps it's equitable to its only definition and purpose as well. With mathematics, we are capable of analytically defining events occurring throughout time from an infinite number of observational perspectives following the laws of physics. Mathematics is a necessary tool used to validate the physical interpretation of reality proposed as philosophies until we are capable of identifying them as physics in the study of laws that constitute reality and physical nature.