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The Hybrid Grand Unified Theory

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Preface

The physicist is interested in discovering the laws of inanimate nature and the mathematician uses the depth of his thought into exploring the mathematical concepts. But, the symbiotic connection between physics and mathematics and the enormous usefulness of mathematics in the natural sciences is something quite mysterious. No rational justification appears to be satisfactory to understand the uncanny success of mathematics and its role in physical theories. A possible explanation is that the laws of nature are written in the language of mathematics.

A complete mechanism, natural or man-made, is understood fully by taking it apart, studying its parts or components and their properties and learn how these parts fit to make the whole. It is really a natural way to understand any object or concept. The path of progress in knowledge is similarly a combination of both exposition of parts and their synthesis. Natural sciences and other sciences such as biology, psychology, etc. are reminders of these strides, taken in order to comprehend the world around us and there have been attempts to catch a glimpse of the higher reality and understand it. The human mind is limited and cannot go beyond certain limitations of time, space and causation. Still, the universe is experienced as a dynamic inseparable whole, including the observer in an essential way. In this experience, the traditional concepts of time and space of isolated objects and of cause and effect lose their meaning. Such an experience is very similar to that of the ancient scientists (Rishis). However, they repeatedly insisted that the ultimate reality can never be an object of reasoning, deduction or demonstrable knowledge. It can never be adequately described by words and Max Planck of the modern scientific era observed that science cannot solve the ultimate mystery of nature and that is because in the final analysis, we ourselves are part of nature and therefore part of the mystery we are trying to solve.

The scientists in physics are happy with physical concepts that can be visualized or observed directly. But most of the time they are forced to utilize mathematical concepts to describe the physical concepts. Take for example, the case of the black hole. It is not entirely observable but it is a physical concept because there is an overwhelming evidence of its existence. Although they have verified its existence in the core of galaxies including our milky way, it is not known exactly what it is and therefore, they use the mathematical concept of a singularity to describe it. However that is not amenable to computation or studying its structure. Another such important physical concept is that of the basic con-

stituent of matter. It is very important to know what constitutes matter and it cannot be ignored because of our deep conviction in the order of the universe.

This is our attempt to provide a hybrid grand unified theory to understand the universe, both in its micro/quantum aspects as well as macro/galactic aspects. It is truly a hybrid theory as it tries to encompass both the modern and ancient theories of the universe, together with its functioning at all levels of human comprehension. During this attempt it becomes necessary to acknowledge the ambiguity and limitations of mathematics concerning the fundamental concepts of very large and very small numbers, infinity and the limiting process in general. Although the mathematical modeling is the most advanced methodology of physics and it owes all its tremendous achievements to the former, the existence of unsolved problems and unanswered questions suggest the need for improvement. It is a fact that the origin of the concepts such as natural numbers, rational and irrational numbers, zero, infinity and the place value system, among others, originated in Veda Samhitas, ancient scientific texts of India. However, because of the quirks of our narrated human history, our second hand reception of these concepts from the Arabs and the belief that everything originated in Greece, the true original source appears to have been obscured and lost. It is therefore necessary to return to the source to clarify and understand the basics to shed some light on the existing real number system.

In Chapter 1, we revisit the fundamentals of mathematics to bring out sources of ambiguity in certain basic mathematical concepts. We also raise many questions that are challenging the physicists and discuss the relevance of mathematical methodology in physics. Certain related concepts such as cosmic waves are also considered.

Chapter 2 deals with the mathematics that is essential in aiding the description of physical concepts that are discussed in Chapter 3. In particular, the existing real number system is revised with the purpose of bringing out the useful nature of decimal numeration system in the current digital era of high accuracy computation with the aid of technology. The ambiguity involved in dealing with infinity, limiting process and the computation of very large and very small numbers is minimized. The mathematics of generalized curves, generalized fractals and chaos provides the mathematical modeling of physical concepts that arise in this grand unified theory. The integrated Pontrjagin's maximum principle is briefly discussed as it has been instrumental in solving the famous n -body problem. The introduction of dark numbers as part of the refined real number system paves the way to quantize the basic constituent of matter and in general, dark matter.

In chapter 3, the qualitative modeling is employed to study the search for basic constituent of matter and its ramifications in explaining quantum gravity and macro gravity. The ten natural laws of nature are enumerated and the mathematical model of a superstring is introduced to represent the structure of the basic constituent of matter. Verification of this grand unified theory (GUT) is carried out by explaining various natural phenomena such as ultra-energetic indexcosmic waves, supernova and the rare hit on earth by asteroids inspite of being so close to the astreoid belt, etc.

In Chapter 4, the theoretical consideration of n -body problem and turbulence are described. Also, physics of the mind is investigated since in this grand unified theory, mind

is also an important part in the study of the universe around us.

Finally, in Chapter 5, the hybrid nature of this book is really brought to the fore as it deals with matters of mind and consciousness, evolution and involution, creation and dissolution, etc. according to the view of ancient scientists (Rishis). It is really like coming full circle to consider how much alike are the theories of ancient and modern scientists, relative to the universe around us.

Some of the important features of the book are as follows:

- (i) It puts the real number system on solid foundations without inconsistency and emphasizes the appropriateness of the decimal system as a computation tool;
- (ii) It improves the existing real number system by incorporating the notion of dark numbers and their duals, personal and impersonal infinity;
- (iii) It introduces the superstring as the basic constituent of matter and the fractal nature of the superstring is modeled by the Cauchy representation of dark number;
- (iv) It relates the dark matter of physics and dark numbers of mathematics;
- (v) It employs the truly hybrid approach of combining qualitative mathematics and computation to discover the natural laws in order to explain in a unified way several natural phenomena, at micro/quantum and macro/galactic levels;
- (vi) It attempts to show the common hybrid interaction between modern and ancient scientific theories of nature and search for higher reality.

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