Chapter 12

Causality is Logically Definable: An Eastern Road toward Quantum Gravity

ABSTRACT

This is the conclusion chapter. Bertrand Russell’s view on logic and mathematics is briefly reviewed. An enjoyable debate on bipolarity and isomorphism is presented. Some historical facts related to YinYang are discussed. Distinctions are drawn between BDL from established logical paradigms including Boolean logic, fuzzy logic, multiple-valued logic, truth-based dynamic logic, intuitionist logic, paraconsistent logic, and other systems. Some major comments from critics on related works are answered. A list of major research topics is enumerated. The ubiquitous effects of YinYang bipolar quantum entanglement are summarized. Limitations of this work are identified. Some conclusions are drawn.

INTRODUCTION

Bertrand Russell pointed out:

*Mathematics and logic, historically speaking, have been entirely distinct studies. Mathematics has been connected with science, logic with Greek. But both have developed in modern times: logic has become more mathematical and mathematics has become more logical. The consequence is that it has now become wholly impossible to draw a line between the two; in fact, the two are one. They differ as boy and man: logic is the youth of mathematics and mathematics is the manhood of logic.* (Russell, 1919)

Russell’s view on logic and mathematics has a few implications. First, the origin of mathematics is science and the origin of logic is Greek philosophy but not science. Therefore, certain historical logical or philosophical concepts could be socially constructed and not necessarily scientific in nature. Secondly,
mathematics can become more logical and logic can become more mathematical or scientific. Then, we are entitled to ask the following questions:

1. As an Eastern tradition of equilibrium-based thinking, is YinYang bipolarity scientific?
2. Is isomorphism a scientific principle?
3. Can logic, mathematics, and physics be unified?
4. Can bipolarity as a mathematical physics concept be introduced into logical reasoning?
5. Can bipolar relativity transcend logic, mathematics, and physics?

This chapter presents discussions and conclusions to further clarify the above issues with the remaining sections:

- A Debate on Bipolarity and Isomorphism
- Pondering and Wondering
- Some Historical Facts
- Causality Is Logically Definable
- Bipolar Axiomatization for Physics
- About Ultimate Logic
- Logical Distinctions
- Answers to Critics
- On The Ubiquitous Effects of Quantum Entanglement
- Limitations
- Major Research Topics
- Summary
- References
- Additional Readings
- Key Terms and Definitions

A DEBATE ON BIPOLARITY AND ISOMORPHISM

It has been shown that YinYang bipolarity is indispensable in an equilibrium-based (or symmetry-based) axiomatization of physics because particle-antiparticle pairs form the basis of energy and equilibrium in the universe where electron-positron pair production denoted \((e^-, e^+)\) as an example of the materialization of energy predicted by Einstein’s special relativity has been accurately described by quantum electrodynamics (QED) (Dirac, 1927, 1928; Feynman, 1962, 1985). While the bipolar entangled physical reality can be accounted for by the two reciprocal energies of Yin and Yang, the coexistence and bipolar interactive nature, however, has so far been denied by truth-based mathematical abstraction.

A major argument of classical truth-based mathematical abstraction is that -1 and +1 are isomorphic and \((-,+\) bipolarity is unnecessary in mathematical abstraction. Ironically, no physicist would say electron and positron \((e^-, e^+)\) are isomorphic. Therefore, the so-called -1 and +1 isomorphism has to be a historical blunder. The following is the digest of an enjoyable academic debate between a European colleague, journal reviewer (A), and the author of this monograph (B) that occurred a few years ago.
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