Infinity symbolic violence- Will mathematical symbols mandatory format philosophical problems?

Haocheng Hu

New Channel International Education Jinqiu A-level College, Shenzhen, 51800, China

Abstract. Mathematics was originally born to let people have a handy tool to measure and observe this chaotic world. All the order of mathematics seems so seamless, but the birth of philosophy can often question the system of mathematics without pressure. Mathematics seems to be formed according to the evolution of this world, while philosophy can question everything. The production of infinite concept seems to be related to both mathematics and philosophy. At present, the academic circles have done a lot of research on the application of the concept of infinity in mathematics and philosophy, and there are endless discussions on the potential infinity and actual infinity, but there is a blank in the field of whether the infinite symbol in mathematics is related to the infinity in philosophy. The main research object of this paper is the involvement and application of infinite symbols in mathematics in the field of philosophy. And this paper studies the blending of mathematical symbols and philosophical thoughts. In-depth analysis of whether there is autonomic or dependence between mathematical framework and philosophical thought. This study holds that the appearance of mathematical symbol infinity makes the vague idea of infinity concrete, which is indeed restrictive for thinking, but has an incomparable role in exploring infinity.

Keywords: Mathematical symbols, philosophical thoughts, infinite concept, infinite symbols

1. Introduction

There is a quite interesting discussion about whether the concept of infinity comes from philosophy or mathematics. In fact, philosophy and mathematics are tools to explore the world. Infinity already exists, probably at the beginning of this world. And mathematics and philosophy just happen to explore this concept. Mathematics pays attention to logical structure. Philosophy pays attention to the meaning of existence. The two seem to have different ways of observing the world, but in a way they can be linked by a medium-infinity. In mathematics, "infinity" is like a natural number, which can never be counted, or it can be regarded as a straight line without endpoints, extending infinitely to both sides (Andreev, 2010).

The "infinity" in philosophy is more like a question about the nature of the world: does the universe have boundaries? Is time zero at the beginning or has no starting point? The connection between the two is that they are dealing with "inexhaustible": mathematics constructs infinite models with logic, such as using infinite approximation to find accurate values in calculus, while philosophy ponders the meaning behind these models-is infinity real or a tool created by human brain? Just as you can never draw a real "infinite straight line", but you know what its "infinity" means in your heart, this feeling of "thinking can be imagined but can't reach" is exactly the common fascination of mathematics and philosophy for "infinity" (Bhattacharyya, 2023).

2. Origin of Infinity

Infinity didn't have a genre at first, but only as human's view of the world-unimaginable things can usually be expressed by infinity. It was not until the appearance of Aristotle, an ancient Greek scientist, that infinity was divided into potential infinity and actual infinity. But in fact, Aristotle does not recognize the existence of actual infinity. In the 4th century BC, Aristotle defined infinity in Physics. The author put forward "potential infinity"-infinity can only exist in an "unfinished state", just as a runner keeps approaching the finish line but never reaches it. This idea stems from the practical needs of ancient Greek mathematics: when geometricians calculate the area by "infinite division", they only need to ensure that they can divide it as fine as they want, without actually cutting the line segment

into infinite segments (Brown, 2010). Aristotle thought that if people admit that reality is infinite, it means that the unfinished house is a complete building. This will destroy the logical foundation on which the Greeks live-the law of exclusion and contradiction. In the following two thousand years, no one put forward a decisive theory to prove it for actual infinity. These two thousand years have been dominated by potential infinity. Until the emergence of a person ended the dominance of potential infinity (Hrubeš, 2000).

In 1874, Cantor won the leading position in the Mathematical Yearbook. The author claimed that the set of all natural numbers is a complete mathematical object -actual infinity, and invented that transfinite number are different in infinite size. This directly challenged the mindset in 2000: when mathematicians were still dealing with calculus with potential infinity, Cantor had added infinity to the formula for addition, subtraction, multiplication and division. Through the correspondence law, it is proved that there are as many natural numbers as square numbers (although the latter seems to be less), revealing the infinite nature that parts are equal to the whole. This crazy operation has made countless scholars attack him, but this idea has already laid the foundation for modern set theory (Peiffer, 2015).

In 2000, when the potential is infinite, mathematicians, like well-behaved children, only indirectly touch the truth with "infinite process". Cantor's revolution lies in finding and admitting that real infinity can end the paradox caused by infinity. For example, using "infinite set" to define the continuity of real numbers solves the basic crisis of calculus theory.

3. Main Discussions

3.1. Concepts of mathematical symbols and philosophical

The concrete presentation of "infinity" by mathematical symbols, like an invisible cognitive framework, not only provides a structured tool for philosophical thinking, but also constrains the boundaries of thought invisibly (Perez and Jose, 2024). Since Wallis introduced the infinite symbol in the 17th century, this mathematical representation not only simplifies the calculus operation, but also transforms the originally unexplored infinite concept into an operable and spreadable knowledge carrier. This symbolization process enables the philosophical discussion to get rid of the vague conceptual nature and turn to precise analysis with the help of mathematical models-just as Cantor revealed that infinity exists in different orders of magnitude through set theory, forcing philosophers to re-examine the assumption that infinity is absolute in traditional theory. However, the convenience of symbolic system also comes at a price: when mathematics sets infinity as a directional extension model (such as the extension of number axis), those nonlinear philosophical thoughts are often marginalized as non-standard cognition. This kind of symbolic hegemony even permeates the daily language level, which makes expressions such as "infinite possibility" and "infinite approach" unconsciously carry the genes of mathematical potential infinity and simplify infinity into a single mathematical model (Sokołowski, 2015).

The dialectic of symbolization process is particularly obvious in the history of thought. Mathematical symbols not only constitute cognitive concretization-just as non-Euclidean geometry subverts the concept of absolute space, prompting philosophers to reconstruct the understanding framework of the infinite nature of time and space; It may also lead to ideological restrictions-when Husserl criticized the infinity of mathematics, he essentially exposed the abstract violence of the symbol system to existence (Sparavigna and Baldi, 2016).

The key to keep the thought unlimited is to establish a dynamic balance between the use of symbols and philosophical reflection. This requires people to recognize the role of mathematical symbols in the dissemination of concepts, and to be alert to the risk of limiting the originality of ideas by the symbol system. The author might as well regard mathematical symbols as a "cognitive ladder" of philosophical thinking-fully take advantage of the structural advantages of mathematical framework when constructing theories, and properly dismantle its framework restrictions after completing ideological construction. Just as quantum mechanics relies on both mathematical formalization and

philosophical interpretation, real ideological breakthroughs are often born at the boundary between symbolic accuracy and philosophical openness (Sparavigna and Baldi, 2025). This connection reminds people that when people write infinite symbols, people are not only inheriting the rational tradition of two thousand years, but also inadvertently recreating the thinking collision between Aristotle and Cantor.

3.2. Connection between mathematical symbols and philosophical

When exploring the infinite concept, mathematical symbols and philosophical thoughts form a unique assistance mechanism-the former provides a structured tool, while the latter gives a meaning framework, and they are like intertwined cognitive networks. The birth of infinite mathematical symbols initially served the operational needs of calculus, but it became a hot topic of philosophical discussion in the historical evolution. When philosophers put forward the proposition "whether there is a boundary for freedom", this idea made mathematicians develop an infinite dimensional space model in probability theory (Taissina, 2008). This interaction reveals an essence: mathematics provides an easy-to-understand and operable mathematical model for philosophy, while philosophy endows mathematics with meaning and authority.

The mode of cooperation between them presents dual characteristics. At the tool level, mathematical symbols transform abstract concepts into a formal language that can be spread and dialectical. For example, the concept of "countable infinity" in set theory. On the level of thinking, philosophy continuously questions the presupposition of mathematical symbols to prevent cognitive solidification. When mathematicians declared that "the real infinite set really exists", philosophers reminded that this is just a language setting within a specific theoretical framework, not an absolute truth. Mathematics and philosophy both restrict each other and achieve each other.

The synergistic effect of the two is particularly significant in the cognitive field. The infinite description of "Hilbert space" in quantum mechanics requires not only strict formalization of mathematics, but also philosophical reflection on "observer role". Human cognition, like bipedal walking, needs the support of mathematical accuracy and philosophical criticism alternately. When people stare at the starry sky and think about the infinity of the universe, people’s eyes reveal not only the light-year distance calculated by mathematical formulas, but also the philosopher's dialectics of "existence".

3.3. Discussion

Will the accuracy of mathematical symbols (infinity) lead to the limitations of philosophical thinking? To be precise, yes. Infinity itself is an illusory concept. It is expressed by mathematical symbols, and it is limited by definition domain in order to better observe it. Philosophy according to the concept of infinite symbols in mathematics in order to better understand and use it. However, philosophical thinking does not need too many restrictions, and mathematics itself has great logic. Without these precise logics, mathematics would have collapsed. And the precise logic of mathematics will kill the infinite possibilities brought by philosophy. The formal definition of "infinity" by mathematical symbols is essentially a cognitive invasion. Through Cantor's transfinite numbers, mathematics divides infinity into countable and uncountable levels, and codes this level as a symbolic law. Mathematical symbols, like a precise scalpel, cut open the original chaotic and mysterious concept of infinity and put it into the "countable infinity" and "uncountable infinity".

The worst thing about this kind of symbolic violence is that it makes philosophy gain unprecedented clarity, but it makes thoughts confined to the precise and seamless field of mathematics. This paper can prove mathematically that there will always be vacant rooms in the "Infinite Hotel", but the author can't explain why when staring at the starry sky in the middle of the night, the sense of infinity will make people cry. Just like measuring the curve of waves with vernier calipers, every data is accurate, but the wildness of waves lapping on the shore has already died under the precision of measuring instruments.

The so-called "restriction" of mathematical symbols on philosophical thinking is actually a tool to give meaning to philosophy. Husserl, a phenomenologist, points out that the rigor of mathematics provides an "essentially intuitive" paradigm for philosophy: when Cantor reconstructs infinity with transfinite numbers, its formalization process itself is a phenomenological application of the traditional "absolute infinity"-the accuracy of symbols not only does not stifle philosophy, but turns the chaos of Hegel's "absolute spirit" into an operable tool Phenomenology of Crisis and Transcendence of European Science). Instead of being a cage, mathematical symbols become a quantum tunneling for philosophy to break through the language boundary. The violent essence of symbols is the evolution of ideas. The picture that was originally very abstract and difficult to understand is now more acceptable to most people through this transformation.

This restriction is necessary in other ways. Accurate mathematical formatting can avoid the irrationality of philosophical thinking. Godel's incompleteness law demonstrate that: Any mathematical system, if it is non-contradictory, must have propositions that can neither be proved true nor false. Completely free formal systems are bound to self-destruct. The rigor of mathematics can be the most solid backing of philosophy.

The introduction of mathematical symbols into philosophy will not limit the breadth of philosophy, but will give the greatest support to philosophy authority. Let more philosophical problems be explained in terms of terms. Mathematics is used as a tool of philosophy rather than as a fence to limit ideas.

4. Conclusion

Mathematical symbols build a structured cognitive framework for philosophical thinking, and at the same time quietly delimit the boundaries of ideological discussion. When the symbol of infinity becomes the default tool to understand infinity, the non-quantification in philosophy, such as eternal cyclicity and the integrity of existence, is often reduced to a linear model. This symbolization process not only promotes the precision of ideas, but also endows philosophical significance-making propositions such as free will and the nature of the universe obtain operational ideological paths, and also leads to some philosophical ideas being labeled as "irrational" and marginalized. The real breakthrough in thought often occurs at the intersection of symbolic logic and philosophical intuition: the formula provided by mathematicians and the question of philosophers are not antagonistic, but the bridge of ideological breakthrough-symbols gives ideological accuracy, and philosophy protects the soul that is not locked by formulas.

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