

Research Report: Criticism may turning mathematical truth into logic truth (Science Psychology).



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Summary

This report discusses logic and mathematics in computer science and science as general. It also show a review of some of the available methods provides insights into the changing and improvement of mathematics due to logic and to what extent is logic posses in mathematics and how far true is that mathematics can exist without logic.

Key findings include:

- There has been marked an increase in the use of mathematics especially in the modern days.
- While the increase of mathematical uses as the programming of complex systems advances the need and use of logic increases.
- The ideal of logic lies behind logicians.
- Mathematics and logic exist proportional to each other.

The information presented in this report has been gathered from secondary sources and Introductions of Mathematical Logic class.

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1. Introduction

The application of logic is the most important and profound results in the foundations of mathematics and have had wide influence on the development of philosophy, computer science as well as other fields. If exploited properly, logic has a great deal in all aspects including the reason why we(humans) exist and for what purpose. Any rich enough logical system can not prove its own consistency for example, there is no contradiction like $0 = 1$. This is well expressed by incompleteness theorem therefore logic can harmonize the mathematical and non-mathematical cases however its complicated to prove.

2. Mathematical definition

Mathematics properties can solve some concepts but it does not solve the properties in the physical world which interact through contingent causal relations. There are two plausible to set aside the distinctions between natural and non-natural that arise in mathematical practices which is merely pragmatic and rises the question of mathematical convenience. We can't evaluate the importance of mathematical practice especially for the metaphysical questions unless we get a better sense of what theoretical choices are involved. To make progress we need illustrations with enough meat on them to make clear how rich and intricate judgement of naturalness can be in practice.

3. Logic

Human brain can process petabytes of data per second to keep the body safe and operational. Every human has a brain but thinking differs greatly from one person to another. Logic is defined differently from one person to another, but majority thinks that it's the art of thinking and reasoning that is in strict accordance with the limitations and incapacities of human misunderstanding. The basis of logic is syllogism, consisting of a major and minor premise and a conclusion. The use of logic can be traced in Chinese history in the book, The art of war(孫子兵法), Sun Tzu proved that using logic any battle can be won. He used logic to form battle strategies and then apply mathematical calculations for on how to perform the logic idea. With his war tactics it can be seen that Chinese history contains the main origin of Logic and mathematical usage. His proper reasonable way of thinking about strategies brought us into modern world where logic and mathematical operations are now used as one. In modern days mathematical logic is used in science for different things and in computer science it's the main backbone.

4. How Criticism may Turn Mathematical Truth into Logical Truth

There is a huge scenarios of logic starting with correspondence scenario which state that one seat is for 1 person. The second scenario is represented by size of sets for numerical numbers. These scenarios are well presented by Cantor's theorem which state that for any set A , finite or infinite, denumerable or not it is always true that the size of $p(A)$ is greater than that of A . Logic connectives is the main way used to represent information in mathematical logic, an example is a compound truth table, $\neg((p_1 \supset (p_2 \supset p_1)) \vee \sim(p_1 \supset p_2))$. For solving logical problem formulars matters most for every method (tautologies, logical implication and equivalence) used. Lakatos approach on liars and truth tellers left him with nothing but problems (Lakatos 1976). Due to this impact the problem of mathematical knowledge needs to be turned into logical approach. This is supported by George and Velleman who state that understanding the nature of mathematics does not require asking what makes mathematics possible.

Logic and Science empiricism had matured, though its development continued. It has three main components. One is pure syntactic analysis of the sentences of a (re)constructed language and their relations, on the model of his Logical Syntax of Language. The second is pure semantics founded on the work of Tarski, developed in Carnap's Foundations of Logic and Mathematics and Introduction to Semantics, and importantly qualified in Semantics and Ontology. The third component is 'descriptive semantics', which identifies the sentences – especially the observation sentences uttered by a specific community, especially of scientists, a task Carnap assigned to empirical psychology. According to Carnap, traditional philosophical questions conflate metaphysical, logical and psychological issues in an inherently confused and confusing manner. Modern logic has become a science, leaving behind historical philosophy as nothing but metaphysical non-sense.

The legitimate remainder of epistemology is divided between the logical analysis of science and empirical scientific psychology. The logical analysis of science, in turn, is the pure study of the logical syntax and semantics of the language of science. Thus the legitimate philosophical remainder of epistemology is a branch of applied logic. Carnap's syntactical analysis provides a liberalised version of meaning concept empiricism in terms of verification empiricism. Hence the central problem Carnap addresses is establishing criteria of cognitive significance for two main kinds of sentences: observation sentences and theoretical sentences. The criteria of significance for observation

sentences are to be fully specified on the basis of observation. The criteria of significance for theoretical sentences are then partially specified on the basis of observation sentences. Due to this criteria, conceptual and reality analysis remains priori.

5. Conclusion and Future Work

The main aim of this report was to identify and discuss what logic and mathematics have in common and whether they play major role in computer science department by looking at their background. While paying more respect to Lakatos's philosophy and methodology of mathematics. This is because Lakatos's did not disagree with the rule of double negation and hence the method of reduction.

6. Recommendation

The information collected for this report provides a broad overview of key changes in mathematical logic methods. Further analysis would be possible if the relevant data from year 2020-2022 are taken into test and comparison. The reliance on secondary has resulted in some bias confirmation. For example, it is not possible to identify the existence of logic without mathematics and logic without mathematics. There for greater analysis would enable a more thorough understanding of correctness of logic in mathematics and vise versa.

7. Reference List

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