The History of Infinity

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Abstract—This article shows the history of of Infinity .

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1 Introduction

The concept of infinity is one of the most important and "mysterious" concepts in science. Even in ancient times, many philosophers and mathematicians thought about the contradictions of this concept. In mathematics, the contradictions associated with the idea of infinite numbers have intensified after the establishment of the theory of infinite sets at the end of XIX century. This theory caused many paradoxes in the previous views on mathematics (Wilkins).

2 Body

Introduction of actual infinity as the basic scientific concepts in math has created new problems (as usually every major innovation in science does). Because of this issue, philosophy and mathematics got closer, as the overall objective of these sciences is to achieve a true knowledge of the infinite value. The concept of infinity was developed by Bolzano and Cantor, who were both philosophers and mathematicians. Therefore, this topic is always relevant.

The Ancient Greek philosopher Zeno was best known for the creation of contradictions. Many subsequent philosophers mentioned his name in their works, trying to refute these contradictions or to argue in their favor. Zenon created the idea of proof known as "dichotomy". In this contradiction, Zenon showed the inability to recognize motion, because the moving object before reaching a particular place, must first pass a half way to that place, but before it must pass a half of a half of a way and so on up to an infinite number of times. It is impossible to pass the infinite in a finite time ("Zeno And The Paradox Of Motion").

In 1851, the book of the Czech mathematician and philosopher B. Bolzano "The Paradoxes of the Infinite" was published ("Infinite | Internet Encyclopedia Of Philosophy"). In this book, he made the first attempt to investigate the properties of actual infinity. Philosopher and mathematician Bolzano first developed the theory of infinite value. He has given an infinite value definition, pointed out the possibility of its calculation, applied to the infinite value of geometry, has developed its properties and gave evidence of his views. Bolzano called infinite value of an infinite set, because he could not imagine it in the form of a number, because according to him the number itself is finite. Bolzano distinguished between actual and potential infinity.

The founder of the theory of sets, the German mathematician Georg Cantor has also studied the problem of infinity. Georg Cantor discovered that the properties of finite and infinite sets are quite unlike each other: many of the opera-

tions that are impossible for finite sets, easily carried out for the infinite. Cantor also introduces the arithmetic of infinity. He defined the operations of addition and multiplication of infinite capacity. For infinite power, he has established and the operation of exponentiation with an infinite index. Not all the laws of ordinary arithmetic are transferred to the arithmetic of the natural numbers. Cantor said that the laws of arithmetic infinity differ radically from addictions that prevail in the end, as well as the properties of finite and infinite sets are different. Georg Cantor belongs to the emergence of transfinite numbers, he introduced the concept of the power of an infinite set, divided countable and uncountable infinite sets, introduced to one correspondence of infinite sets, allowing to operate with these notions ("Cantor - 19Th Century Mathematics - The Story Of Mathematics").

3 Conclusion

The concept of the infinite value of the mysterious and enigmatic on the one hand, and attracts its alluring unexplored other. Philosophers have long wondered about the existence of infinity, we viewed it from different angles, but few explored the infinite value and its properties.

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