

## 섹션 20. PHILOSOPHY AND POLITICAL SCIENCE

DOI 10.36074/logos-28.04.2023.54

### DEDUCTION IN LOGIC

**Shkredova Yelyzaveta**

Higher education student of the Faculty of "Computer Sciences"  
*Kharkiv National University of Radio Electronics*

**SCIENTIFIC SUPERVISOR:**

**ORCID ID: 0000-0002-3229-1442**

**Starikova Galina**

Associate Professor of Philosophy, Ph.D. in Philosophy, Associate Professor  
*Kharkiv National University of Radio Electronics*

*UKRAINE*

In our modern world, people use deductive thinking every day without even knowing it. Richard Davidson wrote that people start with generalizations, then apply them to specific situations and, ultimately, draw conclusions [2]. As, for example, in a situation where a person is going to go out. Logical chains are built in a person's head: warm clothes protect from the cold, it is cold outside, a jacket is warm clothes, I will wear a jacket. Everything happens automatically in a split second. Nevertheless the method of deductive thinking is applied and consciously in various fields, such as mathematics, philosophy, law, science, technology and logic. For example, in philosophy, deduction is used to develop arguments and substantiate positions. It is used to analyze and evaluate various philosophical theories and concepts. In computer science, deduction plays an important role in computability theory and the development of formal specifications. In mathematics, the deductive method is widely used to prove theorems. In addition, deduction is used to formalize and study various mathematical theories, such as set theory, algebra and number theory.

In logic, deductive thinking is considered a process of logical inference, based on the generalization and formalization of the prerequisites for obtaining a logical conclusion [1]. In deduction, one begins with a set of premises, also known as premises, and derives logical conclusions from them. A classic example is the so-called syllogism: "All men are mortal. Socrates is a man. Socrates is mortal". This conclusion was obtained by applying deduction to premises, namely, "All men are mortal" and "Socrates is a man." One of the important concepts in deduction is the concept of correctness. The conclusion is correct if it can be logically deduced from the premises. In other words, if the premises are true, then the conclusion must also be true. If the conclusion is wrong, then it is impossible to give a reliable statement about its truth or falsity, since it cannot be deduced from the premises.

Various methods and tools for deriving logical conclusions are used in deduction. One of the most famous methods is modeling using truth tables. The truth table shows the true values of the statement or argument for each possible combination of true values of the underlying statements. By analyzing the truth table, one can determine which statements or arguments are correct or incorrect. The

second method used in deduction is proof by method from the opposite. At the same time, they assume that the statement or argument is false, and then try to show that this assumption is wrong by identifying contradictions. If a contradiction can be found, we can assume that the original statement or argument is correct. Also in deductive logic, the method of logical inference is used, which makes it possible to move from general statements to particular conclusions [3].

In deduction, there are different types of statements and arguments that have different forms and allow you to get different conclusions. For example, there are categorical statements that describe the relationship between classes or categories, for example, "all people are mortal," "some animals have feathers," "no human being is immortal." These statements can be used to infer new statements about classes or categories, such as "some people have no hair." Another type of statement used in deduction is conditional statements. They have the form "if A, then B," where A is the condition, and B is the conclusion that follows from A. for example, "if I finish my work on time, then I will go to the party." Using deduction, it is possible to determine whether a conclusion is correct based on whether a condition has met. In addition, deduction uses logical operators such as "and," "or" and "not." They allow you to combine statements and form more complex arguments and conclusions. For example, "if I finish my work on time and am not tired, then I will go to a party."

Therefore, deduction is an important tool of logical thinking, which makes it possible to extract logical conclusions from the premises. It is used in various fields and allows you to formulate new knowledge and results based on existing statements and laws.

### References:

- [1] Arfken G.B. (2013) *Mathematical Methods for Physicists*. 5<sup>th</sup> ed. Elsevier Science. / G. B. Arfken, H. J. Weber, F. Harrison – P. 1008.
- [2] Copi I. M. (2014) *Introduction to Logic*. 14<sup>th</sup> ed. / I. M. Copi, C. R. Cohen – P. 664.
- [3] Davidson D. H. (1963) Actions, reasons, and causes. *Journal of Philosophy*, № 60 – P. 685–700.