Category theory and applications,

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This bachelor's thesis is devoted to an introduction to category theory and the application of its methods to the study of deterministic finite automata (DFAs).
The thesis begins by introducing the fundamental concepts and constructions of category theory, such as categories, functors, natural transformations, and universal properties. Relevant examples are provided, which are essential for the formulation, analysis, and solution of the problems considered later in the thesis.
The thesis begins by presenting the fundamental concepts and constructions of category theory that are necessary for the formulation and analysis of the problems considered. It then examines the category of deterministic finite automata, defines the morphisms of interest, and studies the interpretation of categorical concepts within automata theory. Attention is devoted to analyzing how general results from category theory are reflected in the structure and properties of deterministic finite automata. The obtained results demonstrate that the categorical approach provides a unified and rigorous framework for the description and analysis of deterministic finite automata.