Comenius University Bratislava
Faculty of Mathematics, Physics and Informatics

THESIS ASSIGNMENT

Name and Surname:	Bc. Erik Řehulka
Study programme:	Computer Science (Single degree study, master II. deg., full time form)
Field of Study:	Computer Science
Type of Thesis:	Diploma Thesis
Language of Thesis:	English
Secondary language:	Slovak

Title: Cyclic edge-connectivity of cubic graphs

Annotation: Cyclic edge-connectivity proved to be an important invariant of graphs, especially cubic ones, since it is tied to many graph properties and can be used in various proofs. A common approach involves decomposing a larger cubic graph along its smallest cycle-separating edge-cut into two smaller ones. Moreover, it has been shown that the smallest counter-examples to many widely-open conjectures have high cyclic edge-connectivity, besides many other properties like the absence of a 3-edge-colouring. For this reason, several authors provided constructions of various not 3-edge-colourable cubic graphs with high cyclic edge-connectivity. The most common approach is to construct a larger graph by interconnecting several building blocks obtained from smaller graphs. Despite its common usage, there are no established tools for proving the desired cyclic edge-connectivity of graphs obtained through this approach.

Aim: This work aims to develop theoretical tools for proving that various constructions of cubic graphs from smaller building blocks have the desired cyclic edge-connectivity. This should emerge from an analysis of published constructions of infinite families of cubic graphs and identifying key properties that should be imposed on building blocks. The developed theory should be demonstrated by providing proofs of the claimed cyclic edge-connectivity for the respective classes.

Supervisor:	Mgr. Jozef Rajník, PhD.
Department:	FMFI.KI - Department of Computer Science
Head of department:	prof. RNDr. Martin Škoviera, PhD.
Assigned:	12.12.2023
Approved:	03.01.2024

prof. RNDr. Rastislav Kráľovič, PhD.
Guarantor of Study Programme

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Student   Supervisor