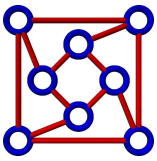

CSGT 2024, June 3–7 2024, Trojanovice
59th Czech-Slovak Conference on Graph Theory 2024
Department of Applied Mathematics
VŠB – Technical University Ostrava, 17. listopadu 2172/15, Ostrava–Poruba

THREE-CUTS ARE A CHARM: ACYCLICITY IN 3-CONNECTED CUBIC GRAPHS

František Kardoš*, Edita Máčajová, Jean Paul Zerafa

In 2023, the three authors solved a conjecture (also known as the S_4-Conjecture) made by Mazzuoccolo in 2013: Let G be a bridgeless cubic graph. Then there exist two perfect matchings of G such that the complement of their union is a bipartite subgraph of G. This is a step closer to comprehend better the Fan–Raspaud Conjecture and eventually the Berge–Fulkerson Conjecture. The S_4-Conjecture, now a theorem, is also the weakest assertion in a series of three conjectures made by Mazzuoccolo in 2013, with the next stronger statement being: For every bridgeless cubic graph G there exist two perfect matchings of G such that the complement of their union is an acyclic subgraph of G. Unfortunately, this conjecture is not true: Jin, Steffen, and Mazzuoccolo later showed that there exists a counterexample admitting 2-cuts. Here we show that, despite of this, every cyclically 3-edge-connected cubic graph satisfies this second conjecture.