

Smallest counterexample to the Fulkerson conjecture must be cyclically 5-edge connected

Edita Máčajová

(joint work with Giuseppe Mazzuoccolo)

The Fulkerson conjecture belongs to one of the most prominent open problems in Graph theory. It suggests that the edges of any bridgeless cubic graph can be covered with six perfect matchings in such a way that each edge belongs to exactly two of them. The origin of this conjecture lies in mathematical programming and the conjecture itself has close connections to configurations of points and lines in the projective space. Despite the fact that Berge and Fulkerson made this conjecture almost half a century ago, it has been verified only for several explicitly defined families of graphs. During the talk we will present the current state of this conjecture as well as its connections to other important conjectures in graph theory. As the main result we show that Fulkerson's conjecture can be reduced to cyclically 5-edge-connected cubic graphs.