Equitable colorings of corona products of cubic graphs

Hanna Furmańczyk
(joint work with Marek Kubale)

A graph is equitably k-colorable if its vertices can be partitioned into k independent sets in such a way that the number of vertices in any two sets differ by at most one. The smallest k for which such a coloring exists is known as the *equitable chromatic number* of G and denoted $\chi_=(G)$. In the talk we consider this problem for coronas of cubic graphs. Although the problem of ordinary coloring of coronas of cubic graphs is solvable in polynomial time, the problem of equitable coloring becomes intractable for these graphs. We give polynomially solvable cases of coronas of cubic graphs and prove the NP-hardness in a general case. As a by-product we obtain a simple linear time algorithm for equitable coloring of such graphs which uses $\chi_=(G)$ or $\chi_=(G)+1$ colors. Our algorithm is best possible, unless $P = NP$. Moreover, cubical coronas are the new class of graphs for which equitable coloring is harder than ordinary coloring.

References

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