EQUITABLE COLORINGS OF CORONA MULTIPRODUCTS OF GRAPHS

HANNA FURMAŃCZYK

Institute of Informatics, University of Gdańsk
Wita Stwosza 57, 80–952 Gdańsk, Poland
e-mail: hanna@inf.ug.edu.pl

MAREK KUBALE

Department of Algorithms and System Modelling
Gdańsk University of Technology
Narutowicza 11/12, 80–233 Gdańsk, Poland
e-mail: kubale@eti.pg.gda.pl

AND

VAHAN V. MKRTCHYAN

Department of Informatics and Applied Mathematics
Yerevan State University, Armenia
e-mail: vahanmkrtchyan2002@ipia.sci.am

Abstract

A graph is equitably k-colorable if its vertices can be partitioned into k independent sets in such a way that the numbers 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 by \( \chi_e(G) \). It is known that the problem of computation of \( \chi_e(G) \) is NP-hard in general and remains so for corona graphs. In this paper we consider the same model of coloring in the case of corona multiproducts of graphs. In particular, we obtain some results regarding the equitable chromatic number for the l-corona product \( G \circ^l H \), where G is an equitably 3- or 4-colorable graph and H is an r-partite graph, a cycle or a complete graph. Our proofs are mostly constructive in that they lead to polynomial algorithms for equitable coloring of such graph products provided that there is given an equitable coloring of G. Moreover, we confirm the Equitable Coloring Conjecture for

---

1Research has been partially supported by Narodowe Centrum Nauki under contract DEC-2011/02/A/ST6/00201

**Keywords:** corona graph, equitable chromatic number, equitable coloring conjecture, equitable graph coloring, multiproduct of graphs, NP-completeness, polynomial algorithm.

**2010 Mathematics Subject Classification:** 05C15, 05C76.

---

**References**


doi:10.1007/978-1-4419-7997-1_25

doi:10.1016/0012-365X(94)00092-W


doi:10.1016/j.disc.2011.11.004


doi:10.1016/j.disc.2011.02.001

Received 22 December 2015
Revised 27 September 2016
Accepted 27 September 2016