2-TONE COLORINGS IN GRAPH PRODUCTS

JENNIFER LOE

Oklahoma Christian University
2501 E. Memorial Rd.
Edmond, OK, 73013, USA

e-mail: jennifer.loe@eagles.oc.edu

DANIELLE MIDDELBROOKS

Spelman College
350 Spelman Ln.
Atlanta, GA 30314, USA

e-mail: dmiddle1@scmail.spelman.edu

ASHLEY MORRIS

Savannah State University
3219 College St.
Savannah, GA 31404, USA

e-mail: amorri13@student.savannahstate.edu

AND

KIRSTI WASH

Clemson University
Box 340975
Clemson, SC 29634, USA

e-mail: kirstiw@clemson.edu

Abstract

A variation of graph coloring known as a t -tone k -coloring assigns a set of t colors to each vertex of a graph from the set $\{1, \dots, k\}$, where the sets of colors assigned to any two vertices distance d apart share fewer than d colors in common. The minimum integer k such that a graph G has a t -tone k -coloring is known as the t -tone chromatic number. We study the 2-tone chromatic number in three different graph products. In particular,

given graphs G and H , we bound the 2-tone chromatic number for the direct product $G \times H$, the Cartesian product $G \square H$, and the strong product $G \boxtimes H$.

Keywords: t -tone coloring, Cartesian product, direct product, strong product.

2010 Mathematics Subject Classification: 05C15, 05C76.

REFERENCES

- [1] A. Bickle and B. Phillips, *t-tone colorings of graphs*, submitted (2011).
- [2] D. Cranston, J. Kim and W. Kinnersley, *New results in t-tone colorings of graphs*, Electron. J. Comb. **20(2)** (2013) #17.
- [3] D. Bal, P. Bennett, A. Dudek and A. Frieze, *The t-tone chromatic number of random graphs*, Graphs Combin. **30** (2013) 1073–1086.
doi:10.1007/s00373-013-1341-9
- [4] N. Fonger, J. Goss, B. Phillips and C. Segroves, *Math 6450: Final Report*, (2011).
<http://homepages.wmich.edu/~zhang/finalReport2.pdf>
- [5] D. West, REGS in Combinatorics. *t-tone colorings*, (2011).
<http://www.math.uiuc.edu/~west/regs/ttone.html>
- [6] R. Hammack, W. Imrich and S. Klavžar, *Handbook of Product Graphs*, Second Edition (CRC Press, Boca Raton, 2011).
- [7] S. Krumke, M. Marathe and S. Ravi, *Approximation algorithms for channel assignment in radio networks*, Wireless Networks **7** (2001) 575–584.
doi:10.1023/A:1012311216333
- [8] V. Vazirani, *Approximation Algorithms* (Springer, 2001).

Received 13 September 2013

Revised 27 January 2014

Accepted 31 January 2014