

THE LIST DISTINGUISHING NUMBER EQUALS THE DISTINGUISHING NUMBER FOR INTERVAL GRAPHS

POPPY IMMEL AND PAUL S. WENGER

*School of Mathematical Sciences
Rochester Institute of Technology
Rochester, NY, USA*

e-mail: pgi8114@rit.edu
pswsma@rit.edu

Abstract

A *distinguishing coloring* of a graph G is a coloring of the vertices so that every nontrivial automorphism of G maps some vertex to a vertex with a different color. The *distinguishing number* of G is the minimum k such that G has a distinguishing coloring where each vertex is assigned a color from $\{1, \dots, k\}$. A *list assignment* to G is an assignment $L = \{L(v)\}_{v \in V(G)}$ of lists of colors to the vertices of G . A *distinguishing L -coloring* of G is a distinguishing coloring of G where the color of each vertex v comes from $L(v)$. The *list distinguishing number* of G is the minimum k such that every list assignment to G in which $|L(v)| = k$ for all $v \in V(G)$ yields a distinguishing L -coloring of G . We prove that if G is an interval graph, then its distinguishing number and list distinguishing number are equal.

Keywords: distinguishing, distinguishing number, list distinguishing, interval graph.

2010 Mathematics Subject Classification: 05C60.

REFERENCES

- [1] M.O. Albertson, *Distinguishing Cartesian powers of graphs*, Electron. J. Combin. **12** (2005) #N17.
- [2] M.O. Albertson and K.L. Collins, *Symmetry breaking in graphs*, Electron. J. Combin. **3** (1996) #R18.
- [3] V. Arvind, C. Cheng and N. Devanur, *On computing the distinguishing numbers of planar graphs and beyond: a counting approach*, SIAM J. Discrete Math. **22** (2008) 1297–1324.
doi:10.1137/07068686X

- [4] V. Arvind and N. Devanur, *Symmetry breaking in trees and planar graphs by vertex coloring*, in: Proceedings of the 8th Nordic Combinatorial Conference, Aalborg University (Aalborg, Denmark, 2004).
- [5] K. Booth and G. Lueker, *Testing for the consecutive ones property, interval graphs, and graph planarity using PQ-tree algorithms*, J. Comput. System Sci. **13** (1976) 335–379.
doi:10.1016/S0022-0000(76)80045-1
- [6] C.T. Cheng, *On computing the distinguishing and distinguishing chromatic numbers of interval graphs and other results*, Discrete Math. **309** (2009) 5169–5182.
doi:10.1016/j.disc.2009.04.004
- [7] C.T. Cheng, *On computing the distinguishing numbers of trees and forests*, Electron. J. Combin. **13** (2006) #R11.
- [8] C. Colbourn and K. Booth, *Linear time automorphism algorithms for trees, interval graphs, and planar graphs*, SIAM J. Comput. **10** (1981) 203–225.
doi:10.1137/0210015
- [9] P. Erdős, A. Rubin and H. Taylor, *Choosability in graphs*, Congr. Numer. **26** (1980) 125–157.
- [10] M. Ferrara, B. Flesch and E. Gethner, *List-distinguishing colorings of graphs*, Electron. J. Combin. **18** (2011) #P161.
- [11] M. Ferrara, E. Gethner, S.G. Hartke, D. Stolee and P.S. Wenger, *List distinguishing parameters of trees*, Discrete Appl. Math. **161** (2013) 864–869.
doi:10.1016/j.dam.2012.10.003
- [12] M. Ferrara, E. Gethner, S.G. Hartke, D. Stolee and P.S. Wenger, *Extending precolorings to distinguish group actions*, arXiv:1405.5558 [math.CO].
- [13] M. Fisher and G. Isaak, *Distinguishing colorings of Cartesian products of complete graphs*, Discrete Math. **308** (2008) 2240–2246.
doi:10.1016/j.disc.2007.04.070
- [14] D. Fulkerson and O. Gross, *Incidence matrices and interval graphs*, Pacific J. Math. **15** (1965) 835–855.
- [15] W. Imrich, J. Jerebic and S. Klavžar, *The distinguishing number of Cartesian products of complete graphs*, European J. Combin. **29** (2008) 922–929.
doi:10.1016/j.ejc.2007.11.018
- [16] W. Imrich and S. Klavžar, *Distinguishing Cartesian powers of graphs*, J. Graph Theory **53** (2006) 250–260.
doi:10.1002/jgt.20190
- [17] W. Imrich, S. Klavžar and V. Trofimov, *Distinguishing infinite graphs*, Electron. J. Combin. **14** (2007) #R36.
- [18] S. Klavžar, T.-L. Wong and X. Zhu, *Distinguishing labellings of group action on vector spaces and graphs*, J. Algebra **303** (2006) 626–641.
doi:10.1016/j.jalgebra.2006.01.045

- [19] S. Klavžar and X. Zhu, *Cartesian powers of graphs can be distinguished by two labels*, European J. Combin. **28** (2007) 303–310.
doi:10.1016/j.ejc.2005.07.001
- [20] A. Lombardi, *Distinguishing extension numbers for $\mathbb{R}^n$ and S^n* , arXiv:1408.5849 [math.co] (2014).
- [21] G. Lueker and K. Booth, *A linear time algorithm for deciding interval graph isomorphism*, J. Assoc. Comput. Mach. **26** (1979) 183–195.
doi:10.1145/322123.322125
- [22] V.G. Vizing, *Coloring the vertices of a graph in prescribed colors*, Diskret. Analiz, Metody Diskret. Anal. v Teorii Kodov i Shem **29** (1976) 3–10 (in Russian).

Received 15 September 2015

Revised 23 March 2016

Accepted 23 March 2016