An Upper Bound for the Circular Chromatic Number of Mycielski Graphs

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ABSTRACT

In a search for triangle-free graphs with arbitrarily large chromatic numbers, Mycielski ([15]) developed a graph transformation that transforms a graph G into a new graph M(G), we now call the Mycielskian of G. For t>= 2, Mt(G) = M(Mt-1(G)). The problem of determining the circular chromatic numbers of these graphs has been investigated in many papers. In this thesis, we shall study the range of Xc(Mt(G)), especially when G is a complete graph (Kn) or a circular complete graph Kkd. In [3], Chang, Huang, and Zhu proved that if ?偙c(G)<=X(G)-r with r=1/2 or 1/3, then Xc(M2t(G))<=(M2t(G))-r for every positive integer t. We find that this property is also true for r = 2/3. That is, when ?偙c(G) is close to X(G)-1,Xc(M2t(G)) will also be close to ?偙(M2t(G))-1 for every positive integer t.

Keywords : Mycielski graph, circular chromatic number

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REFERENCES

[1] H. L. Abbott and B. Zhou. The star chromatic number of a graph, Journal of Graph Theory 17 (1993), 349-360.

[2] J. A. Bondy and P. Hell, A note on the star chromatic number, Journal of Graph Theory 14 (1990), 479-482.

[3] G. J. Chang, L. Huang, and X. Zhu, Circular chromatic numbers of Mycielski ’ s graphs, Discrete Mathematics 205 (1999), 23-37.

[4] G. Fan, Circular chromatic number of Mycielski graphs, Combinatorica 24 (1) (2004), 127-135.

[5] D. C. Fisher, Fractional colorings with large denominators, Journal of Graph Theory 20 (1995), 403-409.

[6] D. C. Fisher, P. A. McKeena, and E. D. Boyer, Hamiltonicity, diameter, domination, packing and biclique partitions of Mycielski ’ s graphs, Discrete Applied Mathematics 84 (1998), 93-105.

[7] D. R. Guichard, Acyclic graph coloring and the complexity of the star chromatic number, Journal of Graph Theory 17 (1993), 129-134.

[8] A. Gyarfas, T. Jensen, M. Stiebitz, On graphs with strongly independent color-classes, Journal of Graph Theory 46 (2004), 1-14.

[9] H. Hajiabolhassan and X. Zhu, Circular chromatic number of subgraphs, Journal of Graph Theory 44 (2003), 95-105.

[10] H. Hajiabolhassan and X. Zhu, Circular chromatic number and Mycielski construction, Journal of Graph Theory 44 (2003), 106-115.

[11] L. Huang and G. J. Chang, The circular chromatic number of the Mycielskian of Gdk, Journal of Graph Theory 32 (1999), 63-71.

[12] P. C. B. Lam, W. Lin, G. Gu, and Z. Song, Circular chromatic number and a generalization of the construction of Mycielski, Journal of Combinatorial Theory, Series B 89 (2003), 195-205.

[13] M. Larsen, J. Propp, and D. Ullman, The fractional chromatic number of Mycielski ’ s graphs, Journal of Graph Theory 19 (1995), 411-416.

[14] D. D-F. Liu, Circular chromatic number for iterated Mycielski graphs, Discrete Mathematics 285 (2004), 335-340.

[15] J. Mycielski, Sur le coloriage des graphes, Colloq. Math. 3 (1955), 161-162.

[16] E. Steffen and X. Zhu, Star chromatic numbers of graphs, Combinatorica 16 (1996), 439-448.

[17] C. Tardif, Fractional chromatic numbers of cones over graphs, Journal of Graph Theory 38 (2001), 87-94.

[18] A. Vince, Star chromatic number, Journal of Graph Theory 12 (1988), 551-559.

[19] X. Zhu, Star chromatic numbers and products of graphs, Journal of Graph Theory 16 (1992), 557-569.

[20] X. Zhu, Circular chromatic number: a survey, Discrete Mathematics 229 (2001), 371-410.