Discussiones Mathematicae
Graph Theory 37 (2017) 811–822
doi:10.7151/dmgt.1954

SATURATION SPECTRUM OF PATHS AND STARS

Jill Faudree

Department of Mathematics and Statistics
University of Alaska Fairbanks

e-mail: jrfaudree@alaska.edu

Ralph J. Faudree

Department of Mathematical Sciences
University of Memphis

Ronald J. Gould

Department of Mathematics and Computer Science
Emory University

e-mail: rg@mathcs.emory.edu

Michael S. Jacobson

and

Brent J. Thomas

Department of Mathematics and Statistical Sciences
University of Colorado Denver

e-mail: michael.jacobson@ucdenver.edu
brent.thomas@ucdenver.edu

Abstract

A graph G is H-saturated if H is not a subgraph of G but the addition of any edge from $\overline{G}$ to G results in a copy of H. The minimum size of an H-saturated graph on n vertices is denoted $\text{sat}(n, H)$, while the maximum size is the well studied extremal number, $\text{ex}(n, H)$. The saturation spectrum for a graph H is the set of sizes of H saturated graphs between $\text{sat}(n, H)$ and $\text{ex}(n, H)$. In this paper we completely determine the saturation spectrum of stars and we show the saturation spectrum of paths is continuous from $\text{sat}(n, P_k)$ to within a constant of $\text{ex}(n, P_k)$ when n is sufficiently large.

Keywords: saturation spectrum, stars, paths.

2010 Mathematics Subject Classification: 05C35, 05C05.

References

[1] K. Amin, J. Faudree and R.J. Gould, *The edge spectrum of K_4-saturated graphs*, J. Combin. Math. Combin. Comput. **81** (2012) 233–242.

[2] K. Amin, J. Faudree, R.J. Gould and E. Sidorowicz, *On the non-$(p-1)$-partite K_p-free graphs*, Discuss. Math. Graph Theory **33** (2013) 9–23.
doi:10.7151/dmgt.1654

[3] C. Barefoot, K. Casey, D. Fisher, K. Fraughnaugh and F. Harary, *Size in maximal triangle-free graphs and minimal graphs of diameter* 2, Discrete Math. **138** (1995) 93–99.
doi:10.1016/0012-365X(94)00190-T

[4] G. Chartrand, L. Lesniak and P. Zhang, Graphs & Digraphs (CRC Press, 2010).

[5] P. Erdős and T. Gallai, *On maximal paths and circuits of graphs*, Acta Math. Acad. Sci. Hungar. **10** (1959) 337–356.

[6] R.J. Gould, W. Tang, E. Wei and C.-Q. Zhang, *The edge spectrum of the saturation number for small paths*, Discrete Math. **312** (2012) 2682–2689.
doi:10.1016/j.disc.2012.01.012

[7] L. Kászonyi and Zs. Tuza, *Saturated graphs with minimal number of edges*, J. Graph Theory **10** (1986) 203–210.
doi:10.1002/jgt.3190100209

Received 29 October 2015
Revised 20 July 2016
Accepted 20 July 2016