PANCYCLICITY WHEN EACH CYCLE MUST PASS EXACTLY k HAMILTON CYCLE CHORDS

FATIMA AFFIF CHAOUCHE

*University of Sciences and
Technology Houari Boumediene
Algiers, Algeria*

e-mail: f.affif@yahoo.fr

CARRIE G. RUTHERFORD

*Faculty of Business
London South Bank University
London, UK*

e-mail: c.g.rutherford@lsbu.ac.uk

AND

ROBIN W. WHITTY

*School of Mathematical Sciences
Queen Mary University of London
London, UK*

e-mail: r.whitty@qmul.ac.uk

Abstract

It is known that $\Theta(\log n)$ chords must be added to an n -cycle to produce a pancyclic graph; for vertex pancyclicity, where every vertex belongs to a cycle of every length, $\Theta(n)$ chords are required. A possibly ‘intermediate’ variation is the following: given k , $1 \leq k \leq n$, how many chords must be added to ensure that there exist cycles of every possible length each of which passes exactly k chords? For fixed k , we establish a lower bound of $\Omega(n^{1/k})$ on the growth rate.

Keywords: extremal graph theory, pancyclic graph, Hamilton cycle.

2010 Mathematics Subject Classification: 05C38.

REFERENCES

- [1] J.A. Bondy, *Pancyclic graphs I*, J. Combin. Theory Ser. B **11** (1971) 80–84.
doi:10.1016/0095-8956(71)90016-5
- [2] J.A. Bondy, *Pancyclic graphs: recent results, infinite and finite sets*, in : Colloq. Math. Soc. János Bolyai, Keszthely, Hungary (1973) 181–187.
- [3] H.J. Broersma, *A note on the minimum size of a vertex pancyclic graph*, Discrete Math. **164** (1997) 29–32.
doi:10.1016/S0012-365X(96)00040-4
- [4] R.M. Corless, G.H. Gonnet, D.E.G. Hare, D.J. Jeffrey and D.E. Knuth, *On the Lambert W function*, Adv. Comput. Math. **5** (1996) 329–359.
doi:10.1007/BF02124750
- [5] J.C. George, A.M. Marr and W.D. Wallis, *Minimal pancyclic graphs*, J. Combin. Math. Combin. Comput. **86** (2013) 125–133.
- [6] S. Griffin, *Minimal pancyclicity*, preprint, arxiv.org/abs/1312.0274, 2013.
- [7] M.R. Sridharan, *On an extremal problem concerning pancyclic graphs*, J. Math. Phys. Sci. **12** (1978) 297–306.

Received 14 April 2014
 Revised 7 November 2014
 Accepted 7 November 2014