

AN IMPLICIT WEIGHTED DEGREE CONDITION FOR HEAVY CYCLES¹

JUNQING CAI

School of Management, Qufu Normal University
Rizhao, 276826, China

e-mail: caijq09@163.com

HAO LI²

Institute for Interdisciplinary Research
Jiangnan University, Wuhan, 430019, China
LRI, UMR 8623, CNRS and Université de Paris-Sud 11
F-91405 Orsay, France

e-mail: li@lri.fr

AND

WANTAO NING

Department of Mathematics and Statistic, Xidian University
Xi'an, Shaanxi 710071, China

e-mail: ningwt05@163.com

Abstract

For a vertex v in a weighted graph G , $id^w(v)$ denotes the implicit weighted degree of v . In this paper, we obtain the following result: Let G be a 2-connected weighted graph which satisfies the following conditions: (a) The implicit weighted degree sum of any three independent vertices is at least t ; (b) $w(xz) = w(yz)$ for every vertex $z \in N(x) \cap N(y)$ with $xy \notin E(G)$; (c) In every triangle T of G , either all edges of T have different weights or all edges of T have the same weight. Then G contains either a hamiltonian cycle or a cycle of weight at least $2t/3$. This generalizes the result of Zhang *et al.* [9].

Keywords: weighted graph, hamiltonian cycles, heavy cycles, implicit degree, implicit weighted degree.

2010 Mathematics Subject Classification: 05C38.

¹This paper is partially supposed by the Scientific Research Foundation for Doctors in Qufu Normal University (2012015) and NNSF of China (11326218).

²Corresponding author.

REFERENCES

- [1] J.A. Bondy, *Large cycles in graphs*, Discrete Math. **1** (1971) 121–132.
doi:10.1016/0012-365X(71)90019-7
- [2] J.A. Bondy and U.S.R. Murty, *Graph Theory with Applications* (Macmillan–London, Elsevier–New York, 1976).
- [3] V. Chvátal and P. Erdős, *A note on hamiltonian circuits*, Discrete Math. **2** (1972) 111–113.
doi:10.1016/0012-365X(72)90079-9
- [4] G.A. Dirac, *Some theorems on abstract graphs*, Proc. Lond. Math. Soc. **2** (1952) 69–81.
- [5] H. Enomoto, J. Fujisawa and K. Ota, *A σ_k type condition for heavy cycles in weighted graphs*, Ars Combin. **76** (2005) 225–232.
- [6] I. Fournier and P. Fraisse, *On a conjecture of Bondy*, J. Combin. Theory (B) **39** (1985) 17–26.
doi:10.16/0095-8956(85)90035-8
- [7] P. Li, *Implicit weighted degree condition for heavy paths in weighted graphs*, J. Shandong Univ. (Nat. Sci.) **18** (2003) 11–13.
- [8] L. Pósa, *On the circuits of finite graphs*, Magyar Tud. Akad. Mat. Kutató Int. Közl **8** (1963) 355–361.
- [9] S. Zhang, X. Li and H. Broersma, *A σ_3 type condition for heavy cycles in weighted graphs*, Discuss. Math. Graph Theory **21** (2001) 159–166.
doi:10.7151/dmgt.1140
- [10] Y. Zhu, H. Li and X. Deng, *Implicit-degrees and circumferences*, Graphs Combin. **5** (1989) 283–290.
doi:10.1007/BF01788680

Received 31 October 2011
Revised 18 November 2013
Accepted 18 November 2013