COMPLETELY INDEPENDENT SPANNING TREES IN k -TH POWER OF GRAPHS

XIA HONG

*Department of mathematics
Luoyang Normal University
Luoyang, 471022, China*

e-mail: 05shumenghongxia@163.com

Abstract

Let $T_1, T_2, \dots, T_k$ be spanning trees of a graph G . For any two vertices u, v of G , if the paths from u to v in these k trees are pairwise openly disjoint, then we say that $T_1, T_2, \dots, T_k$ are completely independent. Araki showed that the square of a 2-connected graph G on n vertices with $n \geq 4$ has two completely independent spanning trees. In this paper, we prove that the k -th power of a k -connected graph G on n vertices with $n \geq 2k$ has k completely independent spanning trees. In fact, we prove a stronger result: if G is a connected graph on n vertices with $\delta(G) \geq k$ and $n \geq 2k$, then the k -th power G^k of G has k completely independent spanning trees.

Keywords: completely independent spanning tree, power of graphs, spanning trees.

2010 Mathematics Subject Classification: 05C05.

REFERENCES

- [1] T. Araki, *Dirac's condition for completely independent spanning trees*, J. Graph Theory **77** (2014) 171–179.
doi:10.1002/jgt.21780
- [2] G. Chen and S. Shan, *Homeomorphically irreducible spanning trees*, J. Combin. Theory Ser. B **103** (2013) 409–414.
doi:10.1016/j.jctb.2013.04.001
- [3] G. Fan, Y. Hong and Q. Liu, *Ore's condition for completely independent spanning trees*, Discrete Appl. Math. **177** (2014) 95–100.
doi:10.1016/j.dam.2014.06.002
- [4] T. Hasunuma, *Completely independent spanning trees in the underlying graph of a line digraph*, Discrete Math. **234** (2001) 149–157.
doi:10.1016/S0012-365X(00)00377-0

- [5] T. Hasunuma, *Completely independent spanning trees in maximal planar graphs*, in: Proceedings of the 28th Graph-Theoretic Concepts Computer Science (WG 2002), Lecture Notes in Comput. Sci. **2573** (2002) 235–245.
doi:10.1007/3-540-36379-3_21
- [6] X. Hong and Q. Liu, *Degree condition for completely independent spanning trees*, Inform. Process. Lett. **116** (2016) 644–648.
doi:10.1016/j.ipl.2016.05.004
- [7] C.St.J.A. Nash-Williams, *Edge-disjoint spanning trees of finite graphs*, J. Lond. Math. Soc. **36** (1961) 445–450.
doi:10.1112/jlms/s1-36.1.445
- [8] F. Péterfalvi, *Two counterexamples on completely independent spanning trees*, Discrete Math. **312** (2012) 808–810.
doi:10.1016/j.disc.2011.11.015
- [9] W.T. Tutte, *On the problem of decomposing a graph into n connected factors*, J. Lond. Math. Soc. **36** (1961) 221–230.
doi:10.1112/jlms/s1-36.1.221

Received 28 April 2016
Revised 30 January 2017
Accepted 7 February 2017