The study of adjaceent fault-tolerance for bipanclicity of hypercube

蕭旻昆、洪春男

E-mail: 9707316@mail.dyu.edu.tw

ABSTRACT

In this thesis, we investigate the adjacent vertices fault-tolerance for bipancyclicity of hypercube. A bipartite graph G = (V, E) is bipancyclic if it contains the cycles of every even length from 4 to |V|. Let Fa be the set of fa pairs of adjacent vertices and Fe be the set of fe faulty edges in the n-dimensional hypercube Qn. We will show that Qn . Fa . Fe is bipancyclic for fa + fe = n . 2. A bipartite graph G = (V, E) is edge-bipancyclic if every edge of G lies on cycles of every even length from 4 to |V|. We will show that Qn . Fa . Fe is edge-bipancyclic for fa + fe = n . 2, 0 . fa . n .3.

Keywords : hypercube, bipancyclic, edge-bipancyclic, fault-tolerant

Table of Contents

REFERENCES

[1] Toru Araki and Yosuke Kikuchi, \Hamiltonian laceability of bubble-sort graphs with edge faults," Information Sciences, pp.2679-2691, (2007).

[2] Rostislav Caha and Vclav Koubek, \Spanning multi-paths in Hypercubes," Discrete Mathematics, pp.2053-2066, (2007).

[3] Y-Chuang Chen, Chang-Hsiung Tsai, Lih-Hsing Hsu, and Jimmy J.M. Tan \On some super Fault-tolerant Hamiltonian graphs," Applied Mathematics and Computation, pp.729-741, (2004).

[4] Tomas Dvorak and Petr Gregor \Hamiltonian Fault-tolerance of Hypercubes," Electronic Notes in Discrete Mathematics, pp.471-477, (2007).

[5] Tomas Dvorak and Petr Gregor \Hamiltonian paths with prescribed edges in Hypercubes," Discrete Mathematics, pp.1982-1998, (2007).

[6] Jianxi Fan, Xiaola Lin, Yi Pan, and Xiaohua Jia \Optimal Fault-tolerant embedding of paths in twisted cubes," J. Parallel Distrib. Comput., pp.205- 214, (2007).

[7] Jung-Sheng Fu, \Conditional fault Hamiltonicity of the complete graph," To appear Information Processing Letters, (2008).

[8] S.-Y.Hsieh and T.-H.Shen, \Edge-bipancyclicity of a hypercube with faulty vertices and edges," Disc. Appl. Math. (2007), doi:10.1016/j.dam.2007.08.043 [9] Sun-Yuan Hsieh and Che-Nan Kuo, \Hamiltonian-connectivity and strongly Hamiltonian-laceability of folded Hypercubes," Computers and Mathematics with Applications, pp.1040-1044, (2007).

[10] Sun-Yuan Hsieh, Gen-Huey Chen, and Chin-Wen Ho, \Hamiltonian- laceability of Star graphs," Networks, pp.225-232, (2000).

[11] Hong-Chun Hsu, Liang-Chih Chiang, Jimmy J.M. Tan, and Lih-Hsing Hsu, \Fault Hamiltonicity of augmented cubes," Parallel Computing, pp.131-145, (2005). {32{ [12] Wen-Tzeng Huang, Y.C. Chuang, J.M. Tan, and L.H. Hsu, \On the Fault- tolerant Hamiltonicity of faulty crossed cubes," IEICE Transaction on Fun- damentals of Electronics, Communications and Computer Sciences, pp.1359- 1370, (2002).

[13] Wen-Tzeng Huang, J. M. Tan, C. N. Hung, and L. H. Hsu, \Fault-tolerant Hamiltonicity of twisted cubes," Journal of Parallel and Distributed Comput- ing, pp.519-604, (2002).

[14] Chun-Nan Hung, Y. H. Chang, and C. M. Sun, \Longest paths and cycles in fault hypercubes," Proceedings of the IASTED ICPDCN, pp.101-110, (2006).

[15] Chun-Nan Hung, Lih-Hsing Hsu, and Ting-Yi Sung, \On the Construction of Combined k-Fault-Tolerant Hamiltonian Graphs," NETWORKS, pp.165-170, (2001).

[16] Chun-Nan Hung, Hsuan-Han Chang, and Guan-Yu Shi, \Fault tolerance for Hamiltonian cycle of node expansion on Hypercube," National Computer Sym- posium, pp.621-626, (2007).

[17] Chun-Nan Hung, Chi-Lai Liu, and Hsuan-Han Chang, \Edge for tolerance for two spanning disjoint paths of Star network," To appear in Processing of the 25rd Workshop on Combinatorial Mathematics and Computational Theory, pp.375-384, (2008).

[18] Chun-Nan Hung and Guan-Yu Shi, \Vertex Fault tolerance for multiple span- ning paths in Hypercube," Processing of the 24rd Workshop on Combinatorial Mathematics and Computational Theory, pp.241-250, (2007).
[19] Hao-Shun Hung, Jung-Sheng Fu, and Gen-Huey Chen, \Fault-free Hamilto- nian cycles in crossed cubes with conditional link faults," Information Sci- ences, pp.5664-5674, (2007).
[20] S.-Y.Hsieh and T.-H.Shen, \Edge-bipancyclicity of a hypercube with faulty vertices and edges," Disc. Appl. Math. (2007), doi:10.1016/j.dam.2007.08.043 {33{ [21] Sun-Yuan Hsieh and Che-Nan Kuo, \Hamiltonian-connectivity and strongly Hamiltonian-laceability of folded Hypercubes," Computers and Mathematics with Applications, pp.1040-1044, (2007).
[22] Sun-Yuan Hsieh, Gen-Huey Chen, and Chin-Wen Ho, \Hamiltonian- laceability of Star graphs," Networks, pp.225-232, (2000).
[23] Tseng-Kuei Li , Chang-Hsiung Tsai , Jimmy J.M.Tan , and Lih-Hsing Hsu, \Bipanconnectivity and edge-fault-tolerant bipancyclicity of hypercubes," In- formation Processing Letters, 87, pp.107-110, (2003).
[24] Tseng-Kuei Li, Jimmy J. M. Tan, and Lih-Hsing Hsu, \Hyper Hamiltonian laceability on edge fault Star graph," Information Sciences, pp.59-77, (2007).
[25] Krishnendu Mukhopadhyaya and Bhabani P. Sinha, \Hamiltonian graphs with minimum number of edges for Fault-tolerant topologies," Information Processing Letters, pp.95-99, (1990).
[26] Chong-Dae Park and Kyung-Yong Chwa, \Hamiltonian properties on the class of Hypercube-like networks," Information Processing Letters, pp.11-17, (2004).
[27] J.-H. Park, H.-C. Kim, and H.-S. Lim, \Fault-Hamiltonicity of Hypercube- like interconnection networks," IEEE International Parallel and Distributed Processing Symposium, pp.60a, (2005).
[28] Youcef Saad and Martin H. Schultz, \Topological properties of Hypercubes," IEEE Transactions On Computers, pp.867-872, (1998).
[29] Chang-Hsiung Tsai, Jimmy J.M. Tan, Tyne Liang, and Lih-Hsing Hsu, \Fault-tolerant Hamiltonian laceability of Hypercubes," Information Process- ing Letters, pp.301-306, (2002).
[30] Chang-Hsiung Tsai and Yung-Chun Lai, \Conditional edge-fault-tolerant edge-bipancyclicity of hypercubes," Information Sciences, pp.5590-5597, (2007). {34{ [31] Aniruddha S. Vaidya, P. S. Nagendra Rao, and S. Ravi Shankar, \A Class of Hypercube-like Networks," Proc. of the 5th Symp. on Parallel and Distributed Processing, pp.800-803, (1993).
[32] Jun-Ming Xu, Zheng-Zhong Du, and Min Xu, \Edge-fault-tolerant edge- bipancyclicity of hypercubes," Information Processing Letters, 96, pp.146-150, (2005).