# The study of Adjacent Vertex-Fault-Tolerance for Hamiltonian cycle passing through prescribed edges of Hypercube


## 賴映潔、洪春男

E-mail: 9806828@mail.dyu.edu.tw



**ABSTRACT**

In this thesis, we consider the problem of a fault-tolerance Hamiltonian cycle passing through prescribed edges in hypercube Qn with some adjacently faulty vertices.

Let Fe ?} E(Qn) be a set of faulty edges, Fa be a set of adjacently faulty vertices, E0 ?} E(Qn ? Fe ? Fa) be the set of prescribed edges where the subgraph induced by E0 is a linear forest(i.e., pairwise vertex-disjoint paths). We construct a Hamiltonian cycle of Qn ? Fe ? Fa passing through all edges of E0 for any | E0 | ?T 2n ? 4 ? 2| Fe | ? 2| Fa | and | Fe | + | Fa | ?T n – 2, for n ?d 3.

We furthermore show that a Hamiltonian cycle of Qn ? Fe ? Fa passing through all edges of E0 for 1 ?T | E0 | ?T 2n – 3 ? 2| Fe | ? 2| Fa | if n ?d 5.



Keywords : hypercube、prescribed edge、adjacently faulty vertices、fault-tolerance


**Table of Contents**



**REFERENCES**


[1] J.A. Bondy, “ Pancyclic graphs. ” I, J. Combin. Theory 11 (1971) 80-84.

[2] J.A. Bondy, U.S.R. Murty, “ Graph Theory with Applications, ” North-Holland,New York, 1980.

[3] R. Caha and V. Koubek, “ Hamiltonian cycles and paths with a prescribed set ofedges in hypercubes and dense sets, ” J. Graph Theory 51 (2005) 137-169.

[4] M.Y. Chan and S.-J. Lee, “ On the existence of Hamiltonian circuits in faultyhypercubes, ” SIAM. J. Discrete Math. 4 (1991) 511-527.

[5] X.-B. Chen, “ Cycles passing through prescribed edges in a hypercube with somefaulty edges, ” Information Processing Letters. 104 (2007) 211-215.

[6] T. Dvo ˇ r?ak, “ Hamiltonian cycles with prescribed edges in hypercubes, ” SIAM J.Discrete Math. 19 (2005) 135-144.

[7] T. Dvo ˇ r?ak and P. Gregor, “ Hamiltonian Fault-tolerance of Hypercubes, ” Elec-tronic Notes in Discrete Math. (2007) 471-477.

[8] J.S. Fu, “ Conditional Fault Hamiltonicity of the Complete Graph, ” InformationProcessing Letters, 107 (2008) 110-113.
[9] F. Harary, “ Graph Theory, ” Addison-Wesley, New York, 1969.
[10] C.N. Hung, Y.H. Chang and C.M Sun, “ Longest paths and cycles in faultyhypercubes, ” Proceeding of the IASTED ICPDCN, (2006) 101-110.
[11] Chun-Nan Hung and Ying-Jie Lai, “ The Hamiltonian cycle passing through prescribededges in hypercubes with adjacently faulty vertices, ” Department of Com-puter Science, Information Engineering.
[12] T.-Y. Ho, Y.-K. Shih, J.J.M. Tan and L.-H. Hsu, “ Conditional fault hamiltonianconnectivity of the complete graph, ” Information Processing Letters (2009).
[13] S.Y. Hsieh and C.H. Chen, “ Pancyclicity on M?obius cubes with maximal edgefaults, ” Parallel Comput. 30 (2004) 407-421.
[14] L.H. Hsu, S.C. Liu and Y.N. Yeh, “ Hamiltonicity of hypercubes with constraintof required and faulty edges, ” J. Combin. Optimization 14 (2007) 197-204.
[15] S.C. Hwang and G.H. Chen, “ Cycles in butterfly graphs, ” Networks. 35 (2)(2000) 161-171.
[16] S. Latifi, S. Q. Zheng and N. Bagherzadeh, “ Optimal ring embedding in hypercubeswith faulty links, ” in Proceedings of the IEEE Symposium on Fault-TolerantComputing, (1992) 178-184.
[17] C.M. Lee, J.M. Tan and L.H. Hsu, “ Embedding hamiltonian paths in hypercubeswith a required vertex in a fixed position, ” Information Processing Letters. 1107(2008) 171-176.
[18] T.K. Li, C.H. Tsai, Jimmy J.M. Tan and L.H. Hsu, “ Bipanconnectivity andedge-fault-tolerant bipancyclicity of hypercubes, ” Information Processing Letters87 (2003) 107-110.
[19] Y. Saad and M. H. Schultz, “ Topological properties of hypercubes, ” IEEE Trans-actions on Computers, vol. 37, pp. 867-872, 1988.
[20] A. Sengupta, “ On ring embedding in hypercubes with faulty nodes and links, ” Information Processing Letters. 68 (1998) 207-214.
[21] L.M. Shih, J.J.M. Tan and L.H. Hsu, “ Edge-bipancyclicity of conditional faultyhypercubes, ” Information Processing Letters. 105 (2007) 20-25.
[22] C.H. Tsai and Y.C. Lai, “ Conditional edge-fault-tolerant edge-bipancyclicity ofhypercubes, ” Inform. Sci. 177 (2007) 5590-5597.
[23] C.H. Tsai, Jimmy J.M. Tan, T. Liang and L.H. Hsu, “ Fault tolerant hamiltonianlaceability of hypercubes, ” Information Processing Letters 83 (2002) 301-306.
[24] W.Q.Wang and X.B. Chen, “ A fault-free Hamiltonian cycle passing through prescribededges in a hypercube with faulty edges, ” Information Processing Letters107 (2008) 205-210.
[25] J.M. Xu, Z.Z. Du and M. Xu, “ Edge-fault-tolerant edge-bipancyclicity of hypercubes, ” Information Processing Letters. 96 (2005) 146-150.
[26] M.C. Yang, T.K. Li, Jimmy J.M. Tan and L.H. Hsu, “ Fault tolerant cycleembeddingof crossed cubes, ” Information Processing Letters 88 (4) (2003)149-154.