

# 二生成超立方體相鄰點容錯性質之研究

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## 摘要

本篇論文研究出兩個 $n$ 維超立方體圖形二生成互斥路徑相鄰點容錯性質的結果。令 $F_a$ 代表相鄰壞點對數的集合， $F_e \subseteq E(Q_n)$ 代表壞邊的集合， $(s_1, s_2, t_1, t_2) \subseteq Q_n = (V_b \cup V_w, E)$ 代表不為壞點的四個點， $s_1, t_1 \in V_b$ 和 $s_2, t_2 \in V_w$ 。當 $Q_n \setminus F_a \setminus F_e$ 時，這邊存在二生成的路徑 $P(s_1, t_1)$ 和 $P(s_2, t_2)$ ， $|F_a| \leq n-4$ 和 $|F_e| \leq n-3$ 。令 $F_v$ 代表在 $Q_n$ 上的兩個壞黑點數集合， $F_e \subseteq E(Q_n)$ 代表壞邊的集合，令 $(s_1, s_2, t_1, t_2) \subseteq Q_n = (V_w, E)$ 代表不為壞點的四個點，當 $Q_n \setminus F_a \setminus F_v$ 時，這邊存在二生成的路徑 $P(s_1, t_1)$ 和 $P(s_2, t_2)$ ， $|F_a| \leq n-4$ 。

關鍵詞：超立方體、相鄰壞點、容錯、二生成互斥路徑

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## 參考文獻

- [1] M. Y. Chan, S.-J. Lee, On the existence of Hamiltonian circuits in faulty hypercubes," SIAM. J. Discrete Math, 4, pp.511-527, 1991.
- [2] Y. H. Chang, C. N. Hung, Adjacent Vertices Fault Tolerance Hamiltonian Laceability of Hypercube Graphs," Workshop on Combinatorial Mathematics and Computation Theory, 22, pp.301-309,2005.
- [3] C. H. Chang, C. K. Lin, H. M. Huang, and L. H. Hsu, The super laceability of the hypercubes," Information Processing Letters, 92, pp.15-21, 2004.
- [4] X. -B. Chen, Cycles passing through prescribed edges in a hypercube with some faulty edges," Information Processing Letters, 104, pp.211-215, 2007.
- [5] Xie-Bin Chen, Many-to-many disjoint paths in faulty hypercubes," Information Sciences, 179, pp.3110-3115, 2009.
- [6] Y-Chuang Chen, Chang-Hsiung Tsai, Lih-Hsing Hsu, Jimmy J.M. Tan, On some super fault-tolerant Hamiltonian graphs," Applied Mathematics and Computation 148, pp.729-741, 2004.
- [7] M. Y. Chen, S.-J. Lee, Distributed fault-tolerant embedding of rings in hypercubes," Parallel Distrib. Comput, 11, pp.63-71, 1991.
- [8] J. S. Fu, Fault-tolerant cycle embedding in the hypercube," Parallel Computing, 29, pp.821-832, 2003.
- [9] C. N. Hung, Y. H. Chang, and C. M. Sun, LONGEST PATHS AND CYCLES IN FAULT HYPERCUBES," Proceedings of the IASTED ICPDCN, pp.101-110, 2006.
- [10] C. N. Hung and K.C. Hu, Fault-tolerant Hamiltonian laceability of bipartite hypercube-like networks," The Proceedings of ICS, pp.1145-1149, 2004.
- [11] S. Y. Hsieh, Fault-tolerant cycle embedding in the hypercube with more both faulty vertices and faulty edges," Parallel Computing, 32, pp.84-91, 2006.
- [12] S. Y. Hsieh, Embedding longest fault-free paths onto star graphs with more vertex faults," Theoretical Computer Science, 337, pp.370-378, 2005.
- [13] L. H. Hsu, S.C. Liu, Y.N. Yeh, Hamiltonicity of hypercubes with constraint of required and faulty edges," J. Combin. Optimization, 14, pp.197-204, 2007.
- [14] T. K. Li, C.H. Tsai, Jimmy J.M. Tan, L.H. Hsu, Bipartite connectivity and edge-fault-tolerant bipancyclicity of hypercubes," Information Processing Letters, 87, pp.107-110, 2003.
- [15] S. Lati, S. Q. Zheng, N. Bagherzadeh, Optimal ring embedding in hypercubes with faulty links," in Proceedings of the IEEE Symposium on Fault-Tolerant Computing, pp.178-184, 1992.
- [16] C. D. Park and K. Y. Chwa, Hamiltonian properties on the class of hypercube like networks," Information Processing Letters, 91, pp.11-17, 2004.

- [17] Abhijit Sengupta, On ring embedding in hypercubes with faulty nodes and links," Information Processing Letters, 68, pp.207-214, 1998.
- [18] G. Simmons, Almost all n-dimensional rectangular lattices are Hamilton laceable," Congr. Numer, 21, pp.103-108, 1978.
- [19] C. H. Tsai, J.J.M. Tan, T.Liang, and L.H. Hsu, Fault-tolerant Hamiltonian laceability of hypercubes," Information Processing Letters, 83, pp.301-306, 2002.
- [20] C. H. Tsai, Y.C. Lai, Conditional edge-fault-tolerant edge-bipancyclicity of hypercubes," Inform. Sci, 177, pp.5590-5597, 2007.
- [21] Tomas Dvorak, Petr Gregor, Hamiltonian Fault-tolerance of Hypercubes," Electronic Notes in Discrete Math, pp.471-477, 2007.
- [22] Tomas Dvorak, Petr Gregor, Hamiltonian paths with prescribed edges in hypercubes," Discrete Mathematics, 307, pp.1982-1998, 2007.
- [23] Y. C. Tseng, Embedding a ring in a hypercube with both faulty links and faulty nodes," Information Processing Letters, 59, pp.217-222, 1996.
- [24] Y. C. Tseng, S.H. Chang, J.P. Sheu, Fault-tolerant ring embedding in star graphs with both link and node failures," IEEE Trans. Parallel Distributed Systems, 8, pp.1185-1195, 1997.
- [25] D. J. Wang, "Embedding Hamiltonian cycles into folded hypercubes with link faults," Journal of Parallel and Distributed Computing, 61, pp.545-564, 2001.
- [26] W. Q. Wang, X.B. Chen, A fault-free Hamiltonian cycle passing through prescribed edges in a hypercube with faulty edges," Information Processing Letters, 107, pp.205-210, 2008.
- [27] Wen-Yan Su and Chun-Nan Hung, The Longest Ring Embedding in Faulty Hypercube," Workshop on Combinatorial Mathematics and Computational Theory, 23, pp.262-272, 2006.
- [28] M. C. Yang, T.K. Li, Jimmy J.M. Tan, L.H. Hsu, Fault tolerant cycle-embedding of crossed cubes," Information Processing Letters, 88, pp.149-154, 2003.