

Adjacent vertices fault-tolerance fanability of hypercube

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ABSTRACT

In this paper, we introduce the concepts of fault tolerant fanability. We show that the n -dimensional hypercube Q_n are f -adjacent and l edges fault tolerant $(n-f-l)^*$ -fanable for $n \geq 3$, $f+l \leq n-2$, $f \leq n-3$. And the graph Q_n is one node f -adjacent l edge $(n-f-l-1)^*$ -fanable, for $f+l \leq n-2$, $f \leq n-3$.

Keywords : n -dimensional hypercube, fanability.

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REFERENCES

- [1] C. H. Chang, C. K. Lin, H. M. Huang, and L. H. Hsu, "The super laceability of the hypercubes," *Information Processing Letters*, Vol. 92, pp. 15-21, 2004.
- [2] C.C. Chen, C.N. Hung, K.C. Hu, "Edge Fault-tolerant of k^* -bifanability for bi-partite Hypercube-like graphs," *Workshop on Combinatorial Mathematics and Computational Theory*, Vol. 22, pp. 134-139, 2005.
- [3] 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.
- [4] C.D. Park, K.Y. Chwa, "Hamiltonian properties on the class of hypercube-like network," *Information Processing Letters*, Vol. 91, pp. 11-17, 2004.
- [5] C. H. Tsai, Jimmy J. M. Tan, T. Liang, and L. H. Hsu, "Fault-tolerant hamiltonian laceability of hypercubes," *Information Processing Letters*, pp. 301-306, 2002.
- [6] C. P. Chang, T. Y. Sung, L. H. Hsu, "Edge congestion and topological properties of crossed cubes," *IEEE Trans. Parallel Distrib. Syst.*, pp. 64-80, 2000.
- [7] F.B. Chedid, "On the generalized twisted cube," *Inform. Proc. Lett.* 55, pp. 49-52, 1995.
- [8] K. Efe, "A variation on the hypercube with lower diameter," *IEEE Trans. on Computers* 40, pp. 1312-1316, 1991.
- [9] K. Efe, "The crossed cube architecture for parallel computing," *IEEE Trans. Parallel Distrib. Syst.*, pp. 513-524, 1992.
- [10] K. Efe, P.K. Blachwell, W. Slough, T. Shiau, "Topological properties of the crossed cube architecture," *Parallel Comput.*, pp. 1763-1775, 1994.
- [11] A.H. Esfahanian, L.M. Ni, B.E. Sagan, "The twisted n -cube with application to multi-processing," *IEEE Trnas. Computers* 40, pp. 88-93, 1991.
- [12] P.A.J. Hilbers, M.R.J. Koopman, J.L.A. van de Snepscheut, "The Twisted Cube, in J. Bakker, A. Nijman, P. Treleven, eds," *PARLE: Parallel Architectures and Languages Europe*, Vol. I: Parallel Architectures, pp. 152-159, 1987.
- [13] K.C. Hu, C.N. Hung, C.C. chen, "Edges fault-tolerant Hamiltonian laceability of bipartite hypercube-like networks," *Workshop on Combinatorial Mathematics and Computational Theory*, pp. 129-133, 2005.
- [14] C.N. Hung, K.C. Hu, "Fault-tolerant Hamiltonian laceability of bipartite hypercube-like networks," *The Proceedings of the 2004 International Computer Symposium*, pp. 1145-1149, 2004.
- [15] P. Kulasinghe, S. Bettayeb, Embedding, "binary trees into crossed cubes," *IEEE Trans. Comput.*, pp. 923-929, 1995.
- [16] S. Latifi, S. Zheng, N. Bagherzadeh, "Optimal ring embedding in hypercubes with faulty links," *Fault-Tolerant Computing Symp.*, pp.

178-184, 1992.

[17] F. T. Leighton, " Parallel Algorithms and Architectures Arrays: Trees and Hy- percubes, Morgan Kaufmann, San Mateo, " 1992.

[18] S. Madhavapeddy, I.H. Sudborough, " A topological property of hypercubes: node disjoint paths, " in Proc. of the 2th IEEE Symposium on Parallel and Distributed Processing SPDP, pp. 532-539, 1990.

[19] J.H. Park, " One-to-Many Disjoint Path Covers in a graph with Faulty Element, " COCOON, pp. 329-401, 2004.

[20] J.H. Park, " One-to-one disjoint path covers in recursive circulants, " Journal of KISS 30, pp. 691-698, 2003.

[21] A. Sengupta, " On ring embedding in hypercubes with faulty nodes and links, " Inform. Proc. Lett. 68, pp. 207-214, 1998.

[22] C.H. Tsai, " Linear array and ring embeddings in conditional faulty hypercubes, " Theoretical Computer Science 314, pp. 431-443, 2004.

[23] A.S. Vaidya, P.S.N Rao, S.R. Shankar, " A class of hypercube-like networks, " Proc. Of the 5th Symp. On Parallel and Distributed Processing, IEEE Comput. Soc., Los Alamitos, CA, pp. 800-803, 1993.

[24] M.C. Yang, T.K. Li, J.M. Tan, L.H Hsu, " Fault-tolerant cycle-embedding of crossed cubes, " Inform. Process. Lett, pp. 149-154, 2003.