Fault-tolerant hamiltonian cycles and paths embedding into locally exchanged twisted cubes

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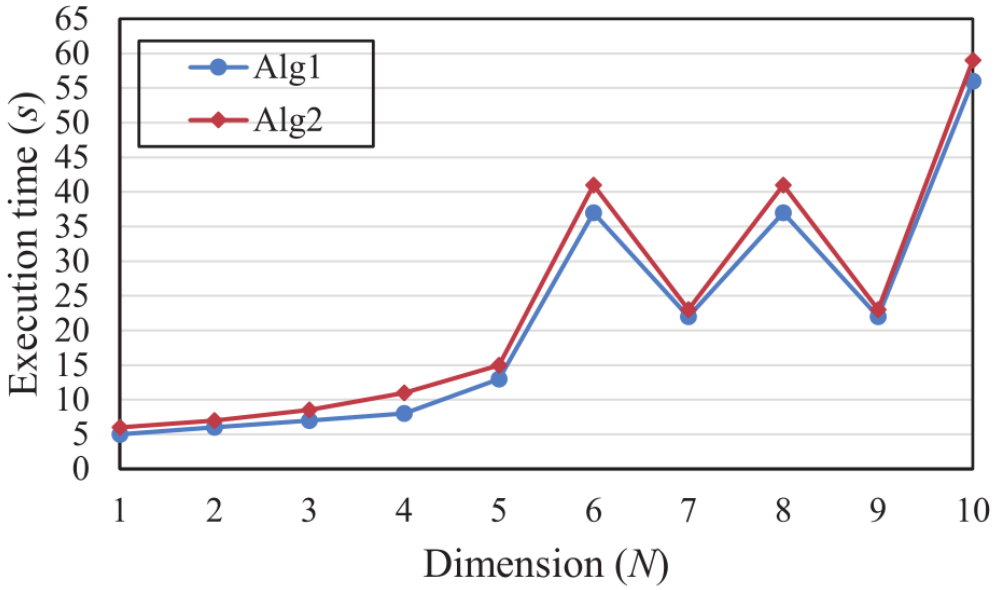
Problems & Ideas

- Problems: Network fault tolerance means that when some components and connections fail at the same time, the remaining subnetworks still have some special functions . The ability of fault-tolerance is a crucial parameter in measuring performance of an interconnection network .Thus, it is natural to consider how to tolerate as manyfaults as possible in the network.
- Ideas: Embedding of Hamiltonian cycles and paths
  - Paths and cycles are two basic network topology for parallel computing.
  - The algebraic problems, graph problems and some parallel applications. can be solved by using efficient algorithms on cycles and paths.
  - If an interconnection network contains paths (or cycles) of different lengths, it can effectively simulate many algorithms designed on linear arrays (or cycles).

Main Contributions

(i) We prove that an *LeTQs,t* can tolerate up to *s* - 1 faulty vertices and edges when embedding a Hamiltonian cycle(Alg1), for $s \geq 2$, $t \geq 3$, and $s \leq t$.

(ii) We prove another result that there is a Hamiltonian path(Alg2) between any two distinct fault-free vertices in a faulty *LeTQs,t* with up to (*s* - 2) faulty vertices and edges, for $s \geq 2$, $t \geq 3$, and $s \leq t$.



The experimental results show that the algorithms have good performance and simulation results indicate that both the time complexity of Algorithms 1 and 2 meet O(*N*log*N*).