Title: GTTPM– An Efficient Deadlock-Free Multicast Wormhole Algorithm for Communication in 2D Torus Multicomputers
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Abstract:

The need for high computing power in various scientific and engineering applications has made parallel processing architectures increasingly popular. Parallel processing systems consist of processing elements or nodes, which are connected together by interconnection networks in various topologies. The torus topology is important because of its many features including scalability, low bandwidth and fixed degree of nodes. This paper presents an efficient algorithm, GTTPM that implement one-to-many, or multicast, communication to find a deadlock-free multicast wormhole routing in two-dimensional torus networks. The introduced algorithm is designed such that can send messages to any number of destinations within two start-up communication phases without any restrictions in the number of rows or columns in a network; hence the name General Torus Two-Phase Multicast (GTTPM) algorithm. An efficient routing function is designed and used as a basis for the presented algorithm. Simulation studies on different torus networks are demonstrated to compare the performance of GTTPM with a previous algorithm.