Communication-Efficient Matrix Multiplication on Hypercubes*

Himanshu Gupta
Department of Computer Science
University of Illinois
Urbana IL 61801

P. Sadayappan
Department of Computer and Info. Science
The Ohio State University
Columbus Ohio 43210

Contact author: Himanshu Gupta. Email:{gupta@geisel.csl.uiuc.edu}

Contact address: Himanshu Gupta
304 E. Clark St., # 201
Champaign IL 61820.

Abstract

In this paper we present an efficient dense matrix multiplication algorithm for distributed memory computers with a hypercube topology. The proposed algorithm performs better than all previously proposed algorithms for a wide range of matrix sizes and number of processors, especially for large matrices. We analyze the performance of the algorithms for two types of hypercube architectures, one in which each node can use (to send *and* receive) at most one communication link at a time and the other in which each node can use all communication links simultaneously.

Keywords Matrix multiplication, distributed algorithms, interprocessor communication, hypercubes, 3-D grids.

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