IMPLEMENTATION OF THE BLAS LEVEL 3 AND LINPACK BENCHMARK ON THE AP1000

RICHARD P. BRENT AND PETER E. STRAZDINS

Abstract

This paper describes an implementation of Level 3 of the Basic Linear Algebra Subprogram (BLAS-3) library and the Linpack Benchmark on the Fujitsu AP1000. The performance of these applications is regarded as important for distributed memory architectures such as the AP1000. We discuss the techniques involved in optimizing these applications without significantly sacrificing numerical stability. Many of these techniques may also be applied to other numerical applications. They include the use of software pipelining and loop unrolling to optimize scalar processor computation, the utilization of fast communication primitives on the AP1000 (particularly row and column broadcasting using wormhole routing), blocking and partitioning methods, and 'fast' algorithms (using less floating point operations). These techniques allow us to obtain a performance of 85-90% of the AP1000's theoretical peak speed for the BLAS Level 3 procedures, and up to 80% for the Linpack benchmark.

Comments

Only the Abstract is given here. The full paper appeared as [4]. For related work see [1, 3, 5].

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Computer Sciences Laboratory and Department of Computer Science, Australian National University, Canberra, ACT 0200
E-mail address: {rpb,peter}@cs.anu.edu.au

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