

io-port 05129154

Stpiczyński, Przemysław

Evaluating recursive filters on distributed memory parallel computers.

Commun. Numer. Methods Eng. 22, No. 11, 1087-1095 (2006).

Summary: The aim of this paper is to show that the recently developed high performance divide and conquer algorithm for solving linear recurrence systems with constant coefficients together with the new BLAS-based algorithm for narrow-banded triangular Toeplitz matrix-vector multiplication, allow to evaluate linear recursive filters efficiently on distributed memory parallel computers. We apply the BSP model of parallel computing to predict the behaviour of the algorithm and to find the optimal values of the method's parameters. The results of experiments performed on a cluster of twelve dual-processor Itanium 2 computers and Cray X1 are also presented and discussed. The algorithm allows to utilize up to 30% of the peak performance of 24 Itanium processors, while a simple scalar algorithm can only utilize about 4% of the peak performance of a single processor.

Keywords: recursive filters; linear recurrences; BLAS; BSP model; mpi
doi:10.1002/cnm.867