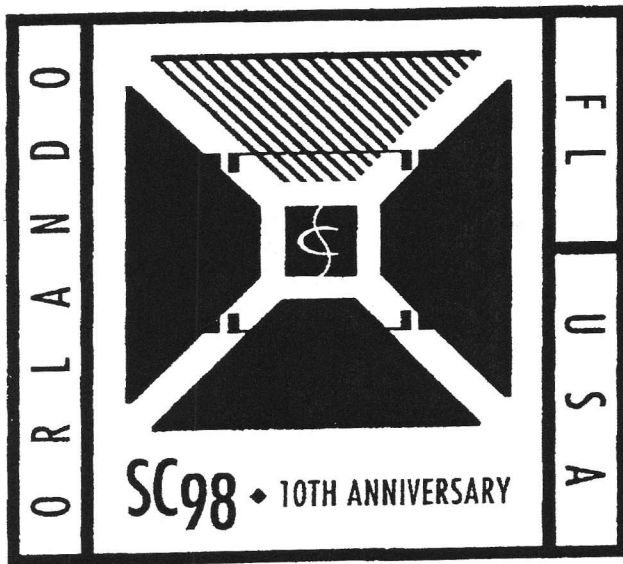


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ABSTRACT

GAPS: Iterative Feedback Directed Parallelisation Using Genetic Algorithms

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GAPS is a prototype compiler which uses a novel iterative feedback directed approach to auto-parallelization. Traditional restructuring transformations are represented as mappings that are applied to each statement and its associated iteration space to generate SPMD code. GAPS uses genetic algorithm optimization to determine the set of mappings that minimizes parallel execution time for an application program. Encouraging initial results show that GAPS delivers performance improvements of up to 25% when the execution times of code produced by GAPS, PFA, PETIT from the Omega Project are compared for ADI, SHALLOW and TRED2 benchmarks on an SGI Origin2000.

ABSTRACT

Efficient Matrix-Vector Processing

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Matrix-vector processing is known to find a wide use within scientific, engineering, financial and economic activity as well as various information processing and high-performance automatic control systems. Large size matrix-vector processing presents a special interest. In this paper it is shown a possibility of creating high performance and highly parallel technology for such computer algebra. It is based on using the new class of hypercomplex systems opened by WE Hamilton but formed by a procedure which is different from the procedure proposed by his followers. This technology allows, for example, to reduce multiplication/summation of two large size matrixes to multiplication/summation of only two real numbers.



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