OPAC: A Floating-Point Coprocessor Dedicated To Compute-Bound Kernels [a]

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ABSTRACT

In many applications, the main part of the computations may be encapsulated in compute-bounds kernels. Achieving high performance on compute-bound primitives at a low hardware cost has became an important challenge. OPAC was designed as the basic cell of a floating-point coprocessor dedicated to the execution of compute-bound kernels. Due to efficient hardware mechanisms for controlling and sequencing a pipeline performance close to a floating-point multiply-add per cycle per cell is reached on applications such as solving linear systems, FFTs or correlations in a microprocessor environment.

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Parallel Electro-Optical Rule-Based System for Fast Execution of Expert Systems

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ABSTRACT

A hybrid electro-optical rule-based system (EORBS) is proposed for the fast and parallel implementation of rule-based systems (RBS's). The EORBS is a hybrid system in which electronics is used for the user interface and optics for the inference engine. The EORBS utilizes two-dimensional optical planes as basic computational entities, and is therefore able to provide concurrent inferencing. Unlike conventional RBS's, EORBS provides parallel matching, selection and rule-firing. The thereotical performance of EORBS is estimated and is shown superior to pure electornic RBS's.