

Embedded systems executing specialized programs are playing an increasing role in computing. This trend has increased the demand for processors that can guarantee high-performance under stringent cost, power and code size constraints. Indirect addressing is by far the most used addressing mode in programs running on these systems, since it enables the design of small and faster instructions. This paper proposes a solution to the problem of allocating registers to array references using auto-increment addressing modes. It extends previous work in the area, by enabling efficient allocation in the presence of control-flow statements. An optimizing DSP compiler, from Conexant Systems Inc., was used to validate this idea. Experimental results reveal a substantial improvement in code performance, when comparing to a priority-based register coloring algorithm.

In this paper we use post-increment only. A generalization to include pre-increment is fairly straightforward.