Peephole Optimization of Asynchronous Networks
Through Process Composition and Burst-mode Machine Generation [1]

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Abstract

In this paper, we discuss the problem of improving the efficiency of macromodule networks generated through asynchronous high level synthesis. We *compose* the behaviors of the modules in the sub-network being optimized using Dill's trace-theoretic operators to get a single behavioral description for the whole sub-network. From the composite trace structures so obtained, we obtain interface state graphs (ISG) (as described by Sutherland, Sproull, and Molnar), encode the ISGs to obtain encoded ISGs (EISGs), and then apply a procedure we have developed called Burst-mode machine reduction (BM-reduction) to obtain burst-mode machines from EISGs. We then synthesize burst-mode machine circuits (currently) using the tool of Ken Yun (Stanford). We can report significant area- and time-improvements on a number of examples, as a result of our optimization method.