ILP Models for the Synthesis of Asynchronous Control Circuits

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A novel strategy for the logic synthesis of asynchronous control circuits is presented. It is based on the structural theory of Petri nets and integer linear programming. Techniques are presented that are capable of checking implementability conditions, such as, complete state coding, and deriving a gate netlist to implement the specified behavior. These techniques can synthesize specifications with few thousands of transitions in the Petri net, providing a speed-up of several orders of magnitude with regard to other existing techniques.