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### **Abstract**

The paper addresses the problem of test derivation from partially defined specifications. A specification is modeled by an Input/Output FSM such that transitions from some states on some inputs are not specified (a partial FSM). Tests have to be derived for a weak conformance, i.e., using the quasi-equivalence relation between FSMs as a conformance relation. The paper further elaborates the state-counting approach by providing an insight into the structure of tests with fault coverage for partial (deterministic) machines with compatible, quasi-equivalent, and distinguishable states and by offering risk-free optimizations which reduce the length of resulting tests. Based on this approach, a method for deriving tests with fault coverage guarantee (checking experiments) is proposed. It is demonstrated that the method is superior to other test derivation methods for deterministic state machines.

**Keywords** : I/O FSMs, partially defined machines, test derivation, weak conformance testing, fault detection, checking experiments.