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Abstract

We address the problem of generating tests from a deterministic Finite State Machine to provide full fault coverage even if the faults may introduce extra states in the implementations. It is well-known that such tests should include the sequences in the so-called traversal set, which contains all sequences of length defined by the number of extra states. Therefore, the only apparent opportunity to produce shorter tests is to find within a test suite a suitable arrangement of the sequences in the inescapable traversal set. We observe that the direct concatenation of the traversal set to a given state cover, suggested by all existing generation methods with full fault coverage, results in extensive test branching, when a test has to be repeatedly executed to apply all the sequences of the traversal set. In this paper, we state conditions which allow distributing these sequences over several tests. We then utilize these conditions to elaborate a method, called SPY-method, which shortens tests by avoiding test branching as much as possible. We present the results of the experimental comparison of the proposed method with an existing method which indicate that the resulting save can be up to 40%.