

## TEST GENERATION USING INDEPENDENT AND CONCURRENTLY-TESTABLE FAULTS

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**ABSTRACT:** The objective of this work is to find suitable targets for automatic test pattern generation (ATPG) such that a minimal test set is obtained for a combinational circuit. We classify any two faults as (1) equivalent, (2) dominant, (3) independent, or (4) concurrently-testable. Independent faults cannot be tested by the same test and concurrently-testable faults must have a common test. From an equivalence or dominance collapsed fault set, an independence graph is generated using structural and functional independences. A collapsing procedure reduces the graph to a fully-connected graph, whose nodes specify concurrently-testable fault targets for the ATPG. We give new algorithms for generating concurrent tests. The examples of ripple-carry adders show that this procedure results in 5 test vectors irrespective of the size of the adder. In comparison, the size of the test set generated by a conventional ATPG continues to increase with the size of the adder.