
Reviewed by Gordon D. Robinson

I found Alex Miczo's book rather disappointing. There is a lot of good material, which the leader would expect from an author of Miczo's long experience in the field, but there is also a lot that is mainly historical. It is unclear whether the book is aimed at designers, test engineers, or CAD tool builders. Only those already familiar with the subject matter will be able to separate current practice from the rest.

After a conventional light opening chapter about the design and test processes and elementary test economics, there are two very long chapters about combinational and sequential test generation methods. Combinational methods include the D algorithm, Critical Path, and PODEM. Several algorithms for sequential circuit test generation are also described. Miczo does warn that they "have been notoriously unsuccessful at testing sequential circuits," but he does so several chapters later.

Each algorithm's operation is described by long paragraphs, which I found difficult to follow, and little attempt is made to identify the similarities and differences among algorithms.

The description of simulation techniques starts off with compiled simulation techniques (using Z80 assembly code), including how to alter the compiled code to introduce faults for fault simulation. Only after this (which is almost guaranteed to scare off any programmer who can build a good simulator) does the book cover event-driven simulation techniques.

Deductive and concurrent fault simulation techniques are covered reasonably well; unfortunately, parallel fault simulation was put in the discussion about compiled simulation techniques.

The chapter ends with a Basic simulation program and a series of exercises to use and alter the simulator, many of which would require much larger programs than the original.

The chapter about automatic test pattern generators is very unsatisfactory. It seems to describe the state of such software in the mid-1970's. It has many comments about the difficulty of modeling modern components, and about how hard it is for pattern generators to work with sequential circuits. However, it fails to draw the obvious conclusions that this is why pattern generators using those algorithms are aimed almost exclusively at highly testable circuit structures.

The chapter on automatic test equipment describes the various types of board testers, and the idea of a mixed test strategy using different types of testers. This chapter would have been stronger if Miczo had included a section on component testers, particularly since modern board and component testers have many similar characteristics.

Miczo also seems unaware of the ability of modern in-circuit test generation software to select tests for components according to the way they are configured, stating that "a test from the manufac-

turer's library may not be usable because of the manner in which a device is used in a circuit."

Several different design for test strategies are covered next, from the normal ad-hoc collection of rules to LSSD and other forms of scan design. What the chapter fails to emphasize is that the design for test strategy must be chosen according to the ATPG tools available to the designer. Some of the material from a later chapter on self-test and fault tolerance would have been better in this chapter, since techniques such as internal signature registers are an important part of many design for test strategies.

The chapters about memory system design and test, self-test, and fault tolerance are a good introduction to some of the techniques used at the architectural level to increase the availability and diagnosability of systems.

The final chapter concentrates on more modern approaches to design and test systems, such as the use of functional hardware description languages and test pattern generation software that uses several descriptions of the circuit's structure and behavior.

The coverage of SCRTSS and HITEST as artificial intelligence methods is clear and helpful in its identification of the strategic decisions these tools make to avoid some of the black holes in conventional approaches to pattern generation for sequential circuits. There are some inaccuracies in the description of HITEST, but none of them affect the basic conclusions Miczo draws.

Overall, the book misses each of its likely readerships. Much of it is description of techniques that have fallen into disuse because of the modeling and computational problems, which Miczo frequently mentions. Readers will get the impression that testing is full of problems, but only with great difficulty will they find any of the current solutions in usable form.

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