

## Preface

With the great and growing use of computers (especially micro-computers) in many aspects of society, it is evident that the computers must perform more and more reliably. The reliability of a computer depends much on testing—that is, the determination whether circuits have been manufactured properly and behave correctly. However, because of the rapidly increasing circuit density in large-scale-integration and very-large-scale-integration technology, testing is getting much more difficult. One approach to alleviating this problem is embodied in “design for testability” techniques, by which extra circuitry is added to a circuit or a chip to reduce the complexity of testing. In the past, design problems were approached with the idea of minimizing the complexity of the hardware. Testing was considered only after the design of a circuit had been completed. Recently, however, design for testability has attracted interest in connection with LSI and VLSI designs, because the cost of hardware has been decreasing while the cost of testing has been increasing. There is now a growing interest in design for testability with the increasing use of VLSI circuits.

This book is intended to provide insight into the theory and practice of logic testing and design for testability. The book is divided into two parts. Part I deals with logic testing and part II with design for testability. Although an attempt is made to include topics of general importance, many important techniques associated with logic testing and design for testability are also dealt with. Related topics include test generation, fault simulation, complexity of testing, design techniques to minimize the cost of test application and test generation, scan design, compact testing, built-in testing, and various design techniques for self-testable systems.

The book may be used as a text for a graduate-level course in electrical engineering or computer science. It should also be helpful to computer designers, logic designers, and test designers who want a better understanding of the principles of logic testing and design for testability and who may apply the techniques to their designs. Researchers who may be interested in going deeper into the study of logic testing and design for testability will also find the book useful.

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