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## **Unfoldings – A Partial-Order Approach to Model Checking**

**EATCS Monographs in Theoretical Computer Science**

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### **Overview**

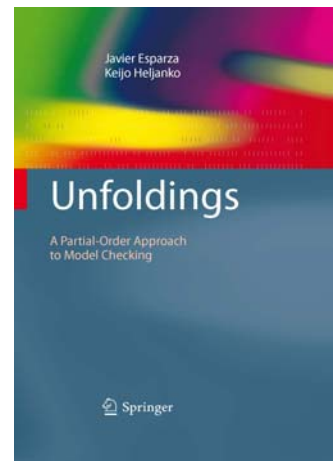
Model checking is a prominent technique used in the hardware and software industries for automatic verification. While it is very successful in finding subtle bugs in distributed systems, it faces the state explosion problem – the number of reachable states grows exponentially in the number of concurrent components.

In this book the authors introduce unfoldings, an approach to model checking which alleviates the state explosion problem by means of concurrency theory. They offer a gentle introduction to the basics of the method, and in particular they detail an unfolding-based algorithm for model checking concurrent systems against properties specified as formulas of linear temporal logic (LTL). Self-contained chapters cover transition systems and their products; unfolding products; search procedures for basic verification problems, such as reachability and livelocks; and model checking LTL. The final chapter summarizes the results of the book, and points the reader to tools and case studies.

The book will be of value to researchers and graduate students engaged in automatic verification and concurrency theory.

### **Contents**

Introduction; Transition Systems and Products; Unfolding Products; Search Procedures for the Executability Problem; More on the Executability Problem; Search Procedures for the Repeated Executability Problem; Search Procedures for the Livelock Problem; Model Checking LTL; Summary, Applications, Extensions, and Tools



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