

Formalized Probability Theory and Applications Using Theorem Proving

Part of the Research Essential Book Series

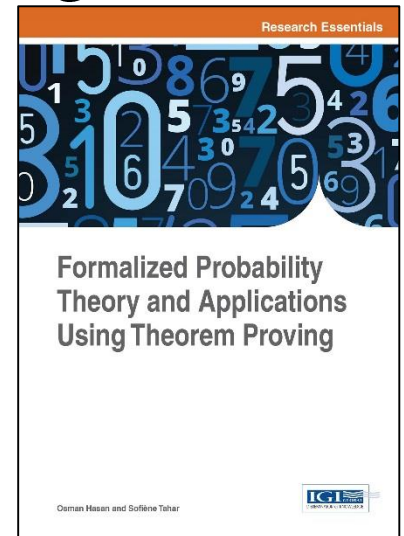
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Description:

Scientists and engineers often have to deal with systems that exhibit random or unpredictable elements and must effectively evaluate probabilities in each situation. Computer simulations, while the traditional tool used to solve such problems, are limited in the scale and complexity of the problems they can solve.

Readers:

This book is an important reference tool for mathematicians, scientists, engineers, and researchers in all STEM fields.



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Topics Covered:

- Formal Probabilistic Analysis
- Higher-Order Logic
- Information Theory
- Lebesgue Integration
- Markov Chains
- Measure Theory
- Probability Theory
- Theorem Proving

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1. PROBABALISTIC ANALYSIS

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- 1.2. Probabilistic Properties
- 1.3. Statistical Properties
- 1.4. Traditional Probabilistic Analysis Methods

2. FORMAL VERIFICATION METHODS

- 2.1. Model Checking
- 2.2. Theorem Proving
- 2.3. Conclusions

3. PROBABILISTIC ANALYSIS USING THEOREM PROVING

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- 3.2. HOL4 Theorem Prover
- 3.3. Conclusions

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- 4.2. Formalization of Measure Theory
- 4.3. Formalization of Lebesgue Integration in HOL
- 4.4. Conclusions

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- 6.4. Formalization of Stationary Process
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- 6.6. AMQM Protocol
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- 13.4. Conclusions

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