



# Markov Chains and Dependability Theory

By Gerardo Rubino, Bruno Sericola

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Dependability metrics are omnipresent in every engineering field, from simple ones through to more complex measures combining performance and dependability aspects of systems. This book presents the mathematical basis of the analysis of these metrics in the most used framework, Markov models, describing both basic results and specialized techniques. The authors first present both discrete and continuous time Markov chains before focusing on dependability measures, which necessitate the study of Markov chains on a subset of states representing different user satisfaction levels for the modelled system. Topics covered include Markovian state lumping, analysis of sojourns on subset of states of Markov chains, analysis of most dependability metrics, fundamentals of performability analysis, and bounding and simulation techniques designed to evaluate dependability measures. The book is of interest to graduate students and researchers in all areas of engineering where the concepts of life-time, repair duration, availability, reliability and risk are important.

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### **About the Author**

Gerardo Rubino is a Senior Researcher at INRIA, France, where he is the scientific leader of the Dionysos team working on the design and the analysis of communication systems. His main research interests are in the quantitative analysis of computer and communication systems through the use of associated stochastic models.

Bruno Sericola is a Senior Researcher at INRIA, France. His main research activity is in computer and communication systems performance evaluation, dependability and perfromability analysis of fault-tolerant systems and applied stochastic processes.

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