Modelling with Generalized Stochastic Petri Nets
M. Ajmone Marsan, G. Balbo, G. Conte, S. Donatelli, G. Franceschinis

Book description (from the cover):
This book presents a unified theory of Generalized Stochastic Petri Nets (GSPNs) together with a set of illustrative examples from different application fields.

The continuing success of GSPNs and the increasing interest in using them as a modelling paradigm for the quantitative analysis of distributed systems suggested the preparation of this volume with the intent of providing newcomers to the field with a useful tool for their first approach.

Readers will find a clear and informal explanation of the concepts followed by formal definitions when necessary or helpful. The largest section of the book however is devoted to showing how this methodology can be applied in a range of domains.

Contents:
Introduction Petri nets and their properties Time in Petri nets Petri nets with priority GSPN basics Analysis of GSPN models GSPN representation of Phase-Type distributions Modelling flexible manufacturing systems Compact models of random polling systems Modelling and analysis of concurrent programs Models of concurrent architectures Stochastic process fundamentals

STOCHASTIC PETRI NETS
- An Introduction to the Theory -
Falko Bause, Pieter S. Kritzinger

Book description (from the cover):
Any engineer who is responsible for the design and development of discrete systems, such as embedded software for control or telecommunications systems, knows that the most important quality of the final product is that it be functionally correct. Once assured that the system behaves correctly, it is also important that it be efficient in that its running cost is minimal or is optimum in whatever quantitative measure is chosen. Stochastic Petri nets have been developed over the last decade with these objectives in mind.

This book is an introduction to Stochastic Petri nets and arose out of a desire by the authors to collect all one needs to understand Stochastic Petri net theory in one volume. It is in three parts. The first part is on stochastic theory leading to introductory queueing theory and simple queues. In Part I we emphasise Markovian theory, because where general queueing theory fails, Markovian analysis can often still be useful. Part II is about Petri nets, starting with ordinary Petri nets and ending with Coloured Petri nets. Ordinary and Coloured Petri nets do not involve time and were developed to test the functionality of concurrent systems. In this part of the book we give an overview of the most important analysis techniques paying particular attention to the validation of those properties which are essential for Stochastic Petri nets. Our emphasis in Part III is on those Stochastic Petri net models which can be analysed by Markovian techniques.

The intention of this book is not to give an overview of several or all Stochastic Petri net models appearing in the literature, but to stress a combined view of functional and performance analysis in the context of some Stochastic Petri net models.

Contents:

STOCHASTIC THEORY
Random variables Markov processes General queueing systems
PETRI NETS
Place-Transition nets Coloured Petri nets Further reading
TIME-AUGMENTED PETRI NETS
Stochastic Petri nets Generalized stochastic Petri nets Queueing Petri nets Further reading
Solutions to selected exercises

Performance Modelling with Deterministic and Stochastic Petri Nets
Christoph Lindemann, University of Dortmund, Germany
405 pages, hard cover, bundled with DSPNexpress Software on CD-ROM, John Wiley & Sons 1998 –
ISBN 0 471 97646 6

Book description (from the cover):
The first to cover the analysis and application of deterministic and stochastic Petri nets, this book provides comprehensive and fully up-to- date coverage of the fundamental techniques and algorithms. These algorithms are also immediately applicable for the analysis of other discrete-event stochastic systems with an underlying stochastic process that can be represented as a generalised semi-Markov process with exponential and deterministic events.

Recent developments in the field have resulted in the need for a text on the subject. This book fills that gap and provides coverage of methodological results on the numerical analysis of deterministic and stochastic Petri nets and their application to performance modelling in parallel computer architecture design.

Throughout, the emphasis is on the exposition of an intuitive explanation for the mathematical results rather than rigorous mathematical proof. Consequently, the book is ideal for computer scientists, applied mathematicians and electrical engineers, who are interested in performance analysis of computer systems and communication networks. For readers new to the subject, an introduction to performance modelling is provided, together with appendices containing a primer to applied probability and common probability distributions.

The book is accompanied by a CD-ROM containing the software package DSPNexpress for several platforms and specification files of a variety of deterministic and stochastic Petri net models.
Contents:
  Part I: Introduction to Performance Modelling
  Performance evaluation of computer systems Stochastic modelling formalisms
  Part II: Deterministic and Stochastic Petri Nets
  Structural properties and reachability analysis Numerical analysis of DSPN without concurrent determinsitic transitions Numerical analysis of DSPN with concurrent determinsitic transitions
  Part III: Performance Analysis of Multiprocessor Systems
  Organisation of multiprocessor systems Modelling node architectures Modelling memory consistency protocols
  Part IV: The Software Package DSPNexpress
  Overview of the software package DSPnexpress The graphical interface of DSPNexpress DSPNexpress Intrinsics
  Appendix: Primer to Applied Probability
  Web site of the book: http://www.first.gmd.de/DSPNexpress/