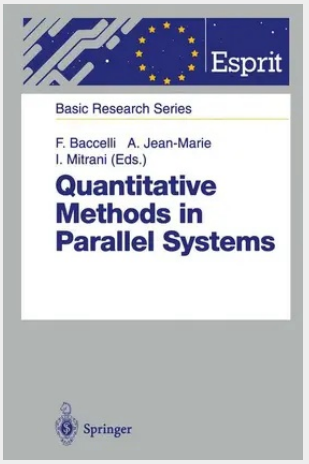
Baccelli / Jean-Marie / Mitrani

Quantitative Methods in Parallel Systems

It is widely recognized that the complexity of parallel and distributed systems is such that proper tools must be employed during their design stage in order to achieve the quantitative goals for which they are intended. This volume collects recent research results obtained within the Basic Research Action Qmips, which bears on the quantitative analysis of parallel and distributed architectures. Part 1 is devoted to research on the usage of general formalisms stemming from theoretical computer science in quantitative performance modeling of parallel systems. It contains research papers on process algebras, on Petri nets, and on queueing networks. The contributions in Part 2 are concerned with solution techniques. This part is expected to allow the reader to identify among the general formalisms of Part I, those that are amenable to an efficient mathematical treatment in the perspective of quantitative information. The common theme of Part 3 is the application of the analytical results of Part 2 to the performance evaluation and optimization of parallel and distributed systems. Part 1. Stochastic Process Algebras are used by N. Gotz, H. Hermanns, U. Herzog, V. Mertsiotakis and M. Rettelbach as a novel approach for the struc tured design and analysis of both the functional behaviour and performability (i.e performance and dependability) characteristics of parallel and distributed systems. This is achieved by integrating stochastic modeling and analysis into the powerful and well investigated formal description techniques of process algebras.



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