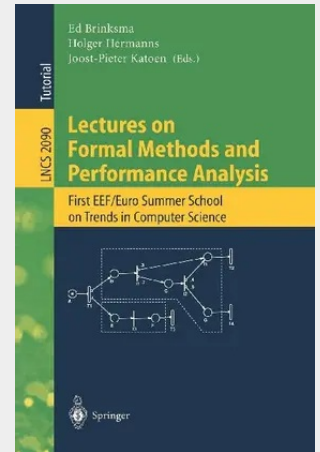


Lectures on Formal Methods and Performance Analysis

First EEF/Euro Summer School on Trends in Computer Science Berg en Dal, The Netherlands, July 3-7, 2000. Revised Lectures

Traditionally, models and methods for the analysis of the functional correctness of reactive systems, and those for the analysis of their performance (and - pendability) aspects, have been studied by different research communities. This has resulted in the development of successful, but distinct and largely unrelated modeling and analysis techniques for both domains. In many modern systems, however, the difference between their functional features and their performance properties has become blurred, as relevant functionalities become inextricably linked to performance aspects, e.g. isochronous data transfer for live video transmission. During the last decade, this trend has motivated an increased interest in combining insights and results from the field of formal methods – traditionally – based on functionality – with techniques for performance modeling and analysis. Prominent examples of this cross-fertilization are extensions of process algebra and Petri nets that allow for the automatic generation of performance models, the use of formal proof techniques to assess the correctness of randomized algorithms, and extensions of model checking techniques to analyze performance requirements automatically. We believe that these developments mark the beginning of a new paradigm for the modeling and analysis of systems in which qualitative and quantitative aspects are studied from an integrated perspective. We are convinced that the further work towards the realization of this goal will be a growing source of inspiration and progress for both communities.

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