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Quantitative
Modeling
In
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Systems

Approximate Throughput Computation of Stochastic Marked Graphs

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Abstract A general iterative technique for approximate throughput computation of stochastic strongly connected marked graphs is presented. It generalizes a previous technique based on net decomposition through a single input–single output cut, allowing the split of the model through any cut. The approach has two basic foundations. First, a deep understanding of the qualitative behaviour of marked graphs leads to a general decomposition technique. Second, after the decomposition phase, an iterative response time approximation method is applied for the computation of the throughput. Experimental results on several examples generally have an error of less than 3%. The state space is usually reduced by more than one order of magnitude; therefore the analysis of otherwise intractable systems is possible.

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