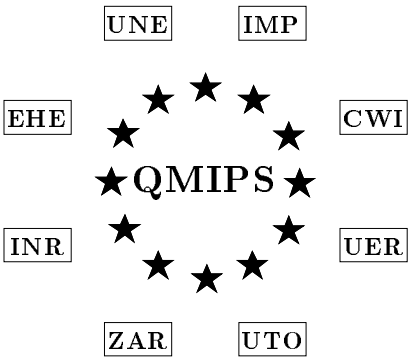

Quantitative
Modeling
In
Parallel
Systems

Computational Algorithms for Product Form Solution Stochastic Petri Nets

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Abstract The combinatorial explosion of the state space of Stochastic Petri Nets (SPN) is a well known problem that inhibits the exact solution of large SPNs and thus a broad use of this kind of formalism as a modelling tool. In this paper we show that the steady state probability distribution of SPNs with product form solution can be efficiently computed

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using an algorithm whose space and time complexities are polynomial in the number of places and in the number of tokens in the initial marking of the SPN.
Basic to the derivation of such an algorithm is a product form solution criterion proposed by J. Coleman, W. Henderson and P.G. Taylor. The algorithm relies on the derivation of a recursive expression of the normalization constant that is a generalization of that derived by J.P. Buzen for multiple class product form queueing networks with load independent service centers.