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PROPOSAL OF A RESEARCH INTERNSHIP FOR STUDENTS OF THE ÉCOLE NORMALE SUPÉRIEURE DE CACHAN

TITLE: Liveness properties for Petri Net extensions with names

AREA: Verification of Infinite State Systems

SUPERVISOR: Fernando Rosa Velardo

DESCRIPTION

A well known formalism for the specification of concurrent infinite state systems is that of Petri Nets. Petri Nets enjoy several nice properties which make them "easy to analyse", in the sense of having many decidability results for their verification. We have been working on the study of extensions of Petri nets for mobility and security. In that line we have defined ν -Petri nets [1], a model of Petri nets extended with dynamic fresh name creation and name management. For them we already know a number of decidability and complexity results [2,3]. Apart from other positive results, for the general model (with unrestricted synchronization) we have undecidability of reachability and non-computability of the cover (downward-closure of reachable states) [4].

During this internship, the student will integrate in the work our group is currently developing. We are now mainly interested in studying restrictions of the general model allowing for restricted forms of synchronization, and in which liveness properties can be decided. This work would eventually link with the recent works carried out for the verification of workflow nets and resource-constrained workflow nets [5,6], which are widely accepted modelling formalisms for business processes.

Finally, and if the duration of the stay permits it, we would like to continue with the study of ν -Petri nets within the more general setting of Well Structured Transition Systems. In particular, we plan to investigate the relation between the computability of the cover and that of the downward-closure of the language the system generates [7,8].

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