

VISITOR RESEARCH REPORT

Visitor Name: Mr. H. Camilo Rocha-Nino

Area of Research: *Software Verification Algorithms*

Period of Visit: May 9, 2011 – June 17, 2011

Goal:

The goal of this visit was to develop an infrastructure for the symbolic analysis of safety properties for PLEXIL.

Strategy:

The strategy was (i) to implement in Maude a prototype of a framework for defining and executing synchronous set relations and (ii) to write a document explaining its formal underpinnings.

Accomplishments:

The prototype has been successfully implemented and exercised with several examples. A document describing the framework has been written into paper format and has been submitted for publication in an international conference on formal methods.

Future Work:

In the immediate future, the framework is going to be extended with support for symbolic analysis of safety properties for PLEXIL. It will be interesting to exercise the framework with more examples and recode some subroutines for enhancing its efficiency.

Pending Publications:

A 16 pages paper co-authored with César Muñoz (LARC) and titled

Simulation and Verification of Synchronous Set Relations in Rewriting Logic

has been submitted for publication in the following international conference on formal methods:

14th Brazilian Symposium on Formal Methods.

The abstract of the paper is the following:

This paper presents a rewriting logic infrastructure for the specification of synchronous set relations. The infrastructure consists of an order-sorted rewrite theory in Maude, a rewriting logic language and system, that enables the synchronous execution of a set relation provided by the user. By using the infrastructure, existing algorithm verification techniques already available in Maude for traditional *asynchronous* rewriting, such as reachability analysis and model checking, are automatically available to synchronous set rewriting. The use of the infrastructure is illustrated with the definition of an executable operational semantics of a simple synchronous language and the verification of temporal properties of a synchronous set relation.

A copy of the paper can be downloaded from <http://camilorocha.info>.