

The BraVAS Project in 4 Minutes

Jérôme Leroux

LaBRI, CNRS & University of Bordeaux, France

Journée CES 40 — 1st December 2017



Consortium

Partner	Name & Position	Involvement
LaBRI	Jérôme Leroux <i>Research Director</i>	24 mm
	Grégoire Sutre <i>Researcher</i>	12 mm
	Diego Figueira <i>Researcher</i>	8 mm
LSV	Philippe Schnoebelen <i>Research Director</i>	16 mm
	Alain Finkel <i>Professor</i>	16 mm
	Jean Goubault-Larrecq <i>Professor</i>	8 mm
	Sylvain Schmitz <i>Associate Professor</i>	8 mm
CRIStAL	Sylvain Salvati <i>Professor</i>	8 mm

Vector addition Systems (VAS) or Petri nets received a lot of attentions in formal verifications & modeling of concurrent systems.

The reachability problem is decidable with the KLM algorithm [Mayr 81]

The result is famous for several reasons:

- the problem itself was open since the '60s.
- the problem resisted for a long time in spite of intense scrutiny.
- the solution proposed by Mayr is notoriously difficult to comprehend.

The reachability problem is open for many natural VAS extensions.

Extending KLM algorithm was out of reach. But recently, Leroux and Schmitz discovered that the KLM algorithm can be explained with wqo ideals paving the way to decide reachability problems for VAS extensions.

Objective

The goal of the BRAVAS project is to develop a new and powerful approach to decide the reachability problems for VASS extensions and to analyse their complexity.

As in any fundamental research, the main risk is that of not being able to reach the goal, viz., establishing the desired decidability and complexity results. However, recent work by the proponents shows that we are on the right track, and intermediate milestones may prove to be interesting in their own right. Moreover, the level of risk is reduced since the project is considering many different counter models.