



# SEMINARIO

## Departamento de Sistemas Informáticos y Computación

Facultad de Informática  
Universidad Complutense de Madrid

18-1-2011

Verification of systems with infinitely  
many states: underapproximations and  
overapproximations

14:00

Sala de Grados  
Facultad de  
Informática

Después de la presentación  
habrá un pequeño refrigerio  
en la Sala de reuniones.

Pierre Ganty  
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We address the safety checking problem by using approximations. Two lines of research are presented. We first introduce an abstraction refinement technique which converges either to a violation of the safety properties as an error trace or to an invariant of the system. Our technique is formalized in the abstract interpretation framework and distinguishes from previous works by avoiding the costly extraction and analysis of abstract counterexamples.

In a second part, we will present pattern-based verification whose goal to find safety violation in shared-memory multithreaded programs over a finite data domain. Because arbitrary recursion is allowed, safety checking is undecidable for those programs. We will present a technique which restricts the search for a safety violation to a subset of the programs behaviors. This subset is given by a regular expression, called the pattern, of the form  $w_1^* \dots w_n^*$  where each  $w_i$  is a finite word over the shared memory states. Our exploration is restricted to all those runs of the programs each of which belongs to the language of the pattern.

Pierre Ganty is a professor at the IMDEA Software Institute (Spain), which he joined in Sept. 2009, after completing his postdoc at the University of California, Los Angeles (UCLA). He holds a PhD in Computer Science from the University of Brussels (Belgium) and from the University of Genova (Italy) and has co-authored papers with outstanding researchers in computer science like Patrick Cousot from ENS (Paris), Javier Esparza from TU Munchen (Germany) and Rupak Majumdar from UCLA (USA).