SEMINARIO

Departamento de Sistemas Informáticos y Computación

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Abstract Interpretation and Code Protection

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In this introductory seminar I will introduce the main concepts of abstract interpretation-based program analysis and transformation and I will show how these can be used for code protection in language-based security.
The design of programs that satisfy a given specification is indeed the dual task of deriving the invariants which holds for a given program at a given program point.
This corresponds to match what a program does w.r.t. how it works, in a la Dijkstra step-wise program construction discipline. Both tasks can be seen as dual facets of the same problem: making program semantics (how it works) and abstractions (what it does) complete, where the lack of completeness is here the lack of precision of an abstraction. Making abstractions complete can be achieved, in the case of program synthesis, by modifying semantics (i.e. programs - how they work), while in the case of program analysis and verification by refining abstractions (what programs are supposed to do).
This correspondence shows that program synthesis and analysis can be conceived together as instances of the problem of making abstract interpretations complete.
We will show this by some examples with concluding remarks on advanced methodologies for program synthesis oriented to code obfuscation and software watermarking.

Roberto Giacobazzi is PhD in Computer Science by the University of Pisa. He is Full Professor at the University of Verona, where he is Dean of the Faculty of Science. He is the leader of the research group in Static analysis and software verification at the dept. of Computer Science of the University of Verona. He is mostly interested in studying systematic methods for approximating undecidable or highly complex problems by means of formal methods, like for instance abstract interpretation theory. Most recently he is applying these methods in security analysis, code obfuscation and malware detection.
Prof. Giacobazzi has been program committee in several international conferences on static program analisis and system verification, and he was organiser of the 30 Years of Abstract Interpretation workshop in honor of Patrick Cousot (2008).