Rewriting activities in Valencia

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HISTORY

In the middle seventies, Prof. Isidro Ramos visited Nancy, invited by Prof. Claude Pair.

They developed joint work on algebraic methodologies, (data) types, logics, etc.

Valencia and Nancy groups visited each other; some joint work was developed.

> Jean-Pierre Jouannaud and Miguel Muñoz. Termination of a Set of Rules Modulo a Set of Equations. In *Proc. of CADE'84*.

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HISTORY

In the middle eighties, María Alpuente developed her PhD thesis co-supervised by Isidro Ramos (UPV) and Giorgio Levi (U. Pisa) on:

Integration of equational and logic programming

From the equational side: *Conditional TRSs and narrowing* were chosen as semantic basis.

From the logic programming side: *Constraint Logic Programming*.

> In the late eighties: ELP group at UPV was founded, lead by María Alpuente.

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Research activities of the ELP group were oriented to:

1. Semantics of the Multiparadigm Declarative Languages

2. Program Analysis

3. Program Transformation

4. Inductive Programming

5. Rewriting Techniques in Programming

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The main achievements in *Semantics of the Integration* were:

1. First formalization of the integration of functional and logic programming in the CLP framework
   (book chapters: MITPress'93; conferences: PLILP'91, CCL'92, ELP'92).

2. Optimization strategies based on incremental narrowing
   (journals: TCS'95; conferences: ILPS'91).

3. Semantics for narrowing computations and compositionality
   (journals: TCS'96, JFLP'01; conferences: ALP'94, ICCL'94, FLOPS'99).

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The main achievements in *Program Analysis* were:

1. Use of abstract narrowing for testing equational unsatisfiability, analyzing functional logic programs and introducing optimizations
   (journals: JLP'95; conferences: CCL'92, PLILP'92, ILPS'93)

2. Semantic optimization of narrowing computations
   (journals: TCS'96; conferences: PLILP'93, ALP'94, ICCL'94)

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The main achievements in *Program Transformation* were:

1. First generic framework for partial evaluation (PE) of functional logic programs
   (journals: TOPLAS'98, ACM-CS'98; conferences: ESOP'96, SAS'98)

2. Definition and implementation of different instances (for orthogonal / inductively sequential / Curry programs) of the PE framework
   (journals: SigNotices'99; conferences: PEPM'97, ICFP'99, LPAR'99, LPAR'00, FLOPS'01)

3. Extensions of the basic PE framework
   (conferences: ASIAN'00, LOPSTR'00)

4. Fold/Unfold trasnformation system for functional logic languages
   (conferences: ALP'97, FLOPS'99)

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The main achievements in *Inductive Programming* were:

1. First framework for the induction of functional logic programs (IFLP)
   (conferences: ILP'99, FLOPS'01)

2. Applications of IFLP in software engineering
   (journals: Automated Sofware Engineering, 2000;
   conferences: FASE'00)

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The main achievements in the use of *Rewriting Techniques in Programming* were:

1. Models for computing with syntactic replacement restrictions (context-sensitive rewriting)
   (journals: JFLP'98; conferences: PLILP'96, PLILP'97, ALP'97)

2. Termination of (extensions of) rewriting and its applications
   (conferences: RTA'95, ICALP'96, PPDP'01)

3. Semantics of rewriting computations
   (journals: JFLP'01; conferences: FLOPS'99, RTA'01)

4. Definition of rewriting strategies
   (journals: IPL'98a,IPL'98b; conferences: ALP'97)

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The ELP group collaborates (or has collaborated) with the following research groups:

U. Kiel	Germany	Michael Hanus
U.C. Madrid	Spain	Mario Rodríguez-Artalejo
U. Málaga	Spain	Ernesto Pimentel
Università di Pisa	Italy	Giorgio Levi
Università di Udine	Italy	Moreno Falaschi
U. Bristol	UK	Peter Flach
LIX Paris	France	Radhia Cousot
U. Paris Sud	France	Jean-Pierre Jouannaud
Portland State U.	USA	Sergio Antoy
IRISA Rennes	France	Eric Bauduel
U. Waseda	Japan	Robert Glück

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International cooperation has been developed within different international research projects.

European Comission - Research Directorates. Human Potential Programme - Research Training Networks.
QuaSiCore: submitted

ESPRIT Networks of Excellence.
Computational Logic Compulog Net

Deutsch & Spanish Sc Research Councils
Acción Integrada (with M. Hanus): to be renewed for 2002-2003

Italian & Spanish Sc Research Councils
Acción Integrada (with M. Falaschi): 2001-2002

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Some national research projects.

CICYT (Spanish Research Funding Agency)

- TIC 98-0445-C03-01 TREND Project (with E. Pimentel and M. Rodríguez-Artalejo)

- TIC 95-0433-C03-03 CPD (with E. Pimentel and M. Rodríguez-Artalejo)

- TIC 92-0793-C02-02 PDR (with M. Rodríguez-Artalejo)

- TIC 91-0425 PROTESIS (with I. Ramos)

- TIC 88-0572 SINTESIS (with I. Ramos)

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Concerning rewriting, current research includes:

1. Analysis of innermost termination of CSR.

2. Comparison between different models for rewriting with syntactic replacement restrictions (first approach submitted to WFLP'01).

3. Termination of OBJ programs (continuing [PPDP'01]).

4. Decidability issues in transfinite rewriting (continuing [RTA'01]; in preparation).

5. Analysis of program properties using rewriting semantics (continuing [RTA'01]; in preparation).