

Two or three things I have learned about Simone Martini

(through Linear Logic)

Simona Ronchi Della Rocca

emerita professor
University of Torino
dept. Informatica

WRITING RESEARCH PROGRAMS

Italian MIUR research projects on Linear Logic

- LINEAR LOGIC AND BEHIND
coord. A. Asperti, Bologna, Roma3, Torino, Verona, 2000-2002.
- PROTOCOLLO (from PROofs TO COmputation thrOugh Linear LOgic)
coord. SRDR, Torino, Bologna, Roma3, Verona, 2002 - 2004.
- FOLLIA (FOndazioni Logiche di Linguaggi Astratti di programmazione)
coord. SRDR, Torino, Bologna, Roma3, Verona, 2004 - 2006.
- CONCERTO (CONtrol and CERTification of resources usage)
coord. SRDR, Torino, Bologna, Roma3, Verona, 2007 - 2009.

DOING RESEARCH (an indirect collaboration)



- Paolo Coppola and Simone Martini, Typing lambda terms in Elementary Logic with linear constraints, TLCA, 2001.
- Paolo Coppola and Simone Martini, Optimizing optimal reduction. A type inference algorithm for elementary affine logic, TOCL (2007)

In order to perform the optimal reduction, a reduction strategy can be easily defined when the lambda terms are typed by formulae of the Elementary Affine Logic. Simone and Paolo designed an algorithm which, given an untyped term, produces a set of constraints whose integer solutions (if any) supply the set of possible derivations for it.

This paper was the starting point of my work on Implicit Computational Complexity, through a collaboration with Paolo Coppola and then Ugo Dal Lago.

- Paolo Coppola and SRDR, Principal Typing for Lambda Calculus in Elementary Affine Logic, *Fund.Inf.*, 2005

Starting from the previous result of Simone and Paolo, we proved that, in the type assignment system for lambda calculus build on the Elementary Affine Logic, terms enjoy the principal type property, i.e., every type is obtained from the principal one by suitable substitutions (of type variables by types and of constraint variables by integers).



- P.Coppola, U.Dal Lago, SRDR, Light Logics and the call-by-value Lambda Calculus, LMCS, 2008.

We tailored the type assignment system designed by Paolo and myself for the call-by-value lambda-calculus, and we proved that typed terms reduces to values in elementary time.

At the same time...



- U.Dal Lago, S. Martini, L.Roversi, Higher-order linear ramified recurrence, Types 2003.

Higher-Order Linear Ramified Recurrence is a linear (affine) λ -calculus extended with a recursive scheme on free algebras. The authors designed a type assignment system for it, and proved that it characterises PTIME computations.

FRIENDSHIP



Girardiana, Siena, 2007

CHANGING

(from a technical to an historical and philosophical view of
Computer Science)

Between the last publications:

- Several types of types in programming languages. History and Philosophy of Computing, 2016
- Pensiero computazionale: una quarta competenza dopo leggere, scrivere e far di conto, Il Nodo, (2017)

**MY BEST WISHES
SIMONE!**