

Preface

In September 1997, the two week MSJ regional workshop on “Theories of Types and Proofs” took place at Tokyo Institute of Technology in Tokyo under the auspices of the Mathematical Society of Japan. This volume is a collection of seven articles which are in principle based on lectures given at the workshop. The articles however contain more expository part than the lectures given at the workshop by the authors, so that the volume will provide an approach for those who are interested in the area but not necessarily have enough background.

The first article, A primer on proofs and types by M. Takahashi, is intended to be a first guide for novices of the area of proof systems and type systems, providing very basic notions and their fundamental properties with some informal ideas behind them.

The second article, Intersection types, λ -models, and Böhm trees by M. Dezani-Ciancaglini, E. Giovannetti, and U. de’Liguoro, provides an instructive introduction to type theory from both syntactical and semantical viewpoint in specializing to the intersection type assignment system.

The third article, Syntax and semantics of type assignment systems by H. Yokouchi, contains a comparative and detailed presentation of known and new type assignment systems with a special attention to their semantic completeness. The systems considered include those with polymorphic types, intersection types, union types, and existential type quantifier.

The fourth article, Inference based analyses of functional programs: dead-code and strictness by M. Coppo, F. Damiani, and P. Giannini, shows how to use type theory for obtaining elegant proofs of program properties such as dead code and strictness analysis.

The fifth article, Constructivization via approximations and examples by S. Baratella and S. Berardi, discusses a new and interesting constructivization technique for classical logic, and its applications to classical first-order arithmetic and to classical real analysis.

The sixth article, Proof-theoretic methods in nonclassical logic — an introduction by H. Ono, gives an extensive analysis of proof theoretic studies of nonclassical logic with emphasis on cut-elimination and its applications.

The last article, An introduction to linear logic: expressiveness and phase semantics by M. Okada, brings the reader to the boundaries of today’s research on specifications of concurrent processes by linear logic. Notably this paper enlightens the meaningful relations between models of concurrent processes and the phase semantics of linear logic.

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