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052141413X - Proof Theory: A Selection of Papers from the Leeds Proof Theory Programme 1990

Edited by Peter Aczel, Harold Simmons and Stanley S. Wainer

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PROOF THEORY

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from the Leeds Proof Theory Programme 1990

edited by

Peter Aczel

University of Manchester

Harold Simmons

University of Manchester

and

Stanley S. Wainer

University of Leeds



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PREFACE

This is a collection of ten refereed papers presented at an international Summer School and Conference on Proof Theory held at Bodington Hall, Leeds University between 24th July and 2nd August 1990. The meeting was held under the auspices of the “Logic for Information Technology” (Logfit) initiative of the UK Science and Engineering Research Council, in collaboration with the Leeds Centre for Theoretical Computer Science (CTCS). The principal funding came from SERC Logfit under contract SO/72/90 with additional contributions gratefully received from the British Logic Colloquium and the London Mathematical Society. There were 100 participants representing at least twelve different countries: Belgium, Canada, Estonia, France, Germany, Italy, Japan, Norway, Sweden, Switzerland, USA and UK.

The first three papers printed here represent short lecture courses given in the summer school and are intended to be of a more instructional nature, leading from basic to more advanced levels of ‘pure’ proof theory. The others are conference research papers reflecting a somewhat wider range of topics, and we see no better way of ordering them than alphabetically by author.

The programme of lectures given at the meeting is set out overleaf. Though not all of the invited speakers were able to contribute to this volume we believe that what remains provides rich flavours of a tasty subject.

Our thanks are due to the referees, to the staff at Bodington Hall for their hospitality, to Frances Johnson of ‘Concilia’ for helpful and efficient conference management, to Pat Boyes of the Leeds School of Mathematics for general secretarial help and large amounts of duplicating, and to Matt Fairtlough and Caroline Wainer for their back-up and assistance.

Peter Aczel (Manchester), Harold Simmons (Manchester), Stan Wainer (Leeds)

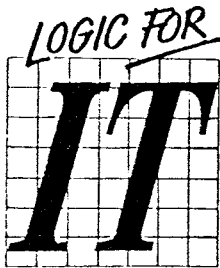
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The University of Leeds

CTCS

Centre for Theoretical
Computer Science

LEEDS PROOF THEORY 1990 PROGRAMME

Summer School Lectures 25 July - 30 July 1990

S. WAINER (Leeds) 3hrs.

L. WALLEN (Oxford) 4hrs.

T. COQUAND (Gothenburg) 4hrs.

W. POHLERS (Münster) 4hrs.

H. SCHWICHTENBERG (Munich) 4hrs.

L. PAULSON (Cambridge) 2hrs.

Basic Proof Theory

Elementary Proof Theory and Search

Generalized Type Systems

Proof Theory and Ordinal Analysis

Proofs as Programs

Applications of Proof Theory to

ISABELLE

Conference Lectures 30 July - 2 August 1990

W. BUCHHOLZ (Munich)

Simplified Ordinal Analysis of Impredicative Theories.

S. BUSS (San Diego)

The Undecidability of K-Provability in Sequent Calculus.

A. CICHON (London)

Proof Theory and Rewrite Systems.

G. DOWEK (Rocquencourt)

Some Problems on the Design of a Mathematical Vernacular.

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x

S. FEFERMAN (Stanford) 3hrs.

Logics and Type Systems for Functional Programming Languages.

F. HONSELL (Udine)

Reasoning about Lambda Terms in Domain Models.

D. HOWE (Cornell)

Applied Proof Theory in NuPRL.

N. MENDLER (Manchester)

Inductive Types via Initial Algebras in Martin-Löf Type Theory.

G. MINTS (Tallinn) 2hrs.

Resolution Calculi for Predicate Modal Logic.

Interplay between Proof Theory and Constructive Ideology in USSR 1950-70.

R. POLLACK (Edinburgh)

Implicit Syntax.

M. RATHJEN (Münster)

Predicative Fragments of Kripke-Platek Set Theory.

W. SIEG (Carnegie-Mellon)

Finite Type Extensions of Fragments of Arithmetic.

J. ZUCKER (McMaster)

Provably Computable Functions on Abstract Data Types.