

# Lattices, Semigroups, and Universal Algebra

# Lattices, Semigroups, and Universal Algebra

Edited by

**Jorge Almeida**

University of Porto  
Porto, Portugal

**Gabriela Bordalo**

University of Lisbon  
Lisbon, Portugal

and

**Philip Dwinger**

University of Illinois at Chicago  
Chicago, Illinois

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## PREFACE

This volume contains papers which, for the most part, are based on talks given at an international conference on Lattices, Semigroups, and Universal Algebra that was held in Lisbon, Portugal during the week of June 20-24, 1988. The conference was dedicated to the memory of Professor António Almeida Costa, a Portuguese mathematician who greatly contributed to the development of algebra in Portugal, on the 10<sup>th</sup> anniversary of his death. The themes of the conference reflect some of his research interests and those of his students.

The purpose of the conference was to gather leading experts in Lattices, Semigroups, and Universal Algebra and to promote a discussion of recent developments and trends in these areas. All three fields have grown rapidly during the last few decades with varying degrees of interaction. Lattice theory and Universal Algebra have historically evolved alongside with a large overlap between the groups of researchers in the two fields. More recently, techniques and ideas of these theories have been used extensively in the theory of semigroups. Conversely, some developments in that area may inspire further developments in Universal Algebra. On the other hand, techniques of semigroup theory have naturally been employed in the study of semilattices. Several papers in this volume elaborate on these interactions.

The conference started with a public session during which J. Morgado addressed the historical significance of Almeida Costa's work on behalf of algebra in Portugal and H. J. Weinert discussed the recent developments connected with his research. The scientific program also included invited survey talks, contributed papers — some which were also presented by invitation — and a problem session. The survey talks were given by J. Berman, M. Ern , R. Freese, G. Gr tzer, P. Jones, G. Lallement, R. McKenzie, W. D. Munn, J. E. Pin, N. R. Reilly, J. Rhodes, J. Varlet, and H. Werner. The general impression among the participants was that the conference met their expectations both scientifically and socially.

The success of this conference depended on many people. Among them, the members of the scientific committee, J. Berman, J. A. Dias da Silva, Ph. Dwinger, J. Furtado Coelho, M. L. Galv o, G. Gr tzer, J. Howie, G. Lallement, R. McFadden, J. Morgado, M. B. Ramalho, J. Varlet, and the members of the Universal Algebra and lattice theory group of the Centro de  lgebra, in particular M. Sequeira, played a role in the preparation of the conference and of these Proceedings which is hereby acknowledged.

The conference took place at the University of Lisbon and was financially supported by the following organizations: “Instituto Nacional de Investigação Científica”, “Junta Nacional de Investigação Científica e Tecnológica”, “Fundação Calouste Gulbenkian”, “Reitoria” of the University of Lisbon, “Conselho Directivo” and Department of Mathematics of the Faculty of Sciences of the University of Lisbon, New University of Lisbon, and “Caixa Geral de Depósitos”. The Lisbon City Council (“Câmara Municipal”) provided a reception for participants at the Town Hall. Without the contributions of these institutions, the conference could not have taken place.

Oporto, Lisbon, Chicago

July, 1989

Jorge Almeida

Gabriela Bordalo

Philip Dwinger

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