Polynomial Completeness in Algebraic Systems

By Kalle Kaarli, Alden F. Pixley

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Boolean algebras have historically played a special role in the development of the theory of general or "universal" algebraic systems, providing important links between algebra and analysis, set theory, mathematical logic, and computer science. It is not surprising then that focusing on specific properties of Boolean algebras has lead to new directions in universal algebra.

In the first unified study of polynomial completeness, Polynomial Completeness in Algebraic Systems focuses on and systematically extends another specific property of Boolean algebras: the property of affine completeness. The authors present full proof that all affine complete varieties are congruence distributive and that they are finitely generated if and only if they can be presented using only a finite number of basic operations. In addition to these important findings, the authors describe the different relationships between the properties of lattices of equivalence relations and the systems of functions compatible with them.

An introductory chapter surveys the appropriate background material, exercises in each chapter allow readers to test their understanding, and open problems offer new research possibilities. Thus Polynomial Completeness in Algebraic Systems constitutes an accessible, coherent presentation of this rich topic valuable to both researchers and graduate students in general algebraic systems.

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Review
"This book gives a thorough, systematic treatment of various notions of polynomial completeness the book is overdue as a reference for universal algebraists." Mathematical Reviews, 2003a

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