1. Record Nr. UNINA9910784596803321

Titolo	Residuated lattices [[electronic resource]] : an algebraic glimpse at substructural logics / / Nikolaos Galatos ... [et al.]
Pubbl/distr/stampa	Amsterdam ; ; Boston, : Elsevier, 2007
ISBN	1-281-05106-3 9786611051068 0-08-048964-8
Edizione	[1st ed.]
Descrizione fisica	1 online resource (532 p.)
Collana	Studies in logic and the foundations of mathematics, , 0049-237X ; ; v. 151
Classificazione	31.10
Altri autori (Persone)	GalatosNikolaos
Disciplina	511.33
Soggetti	Algebraic logic Lattice theory
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 479-495) and index.
Nota di contenuto	Cover; Copyright Page; Table of Contents; Detailed Contents; List of Figures; List of Tables; Introduction; Chapter 1. Getting started; 1.1. First-order languages and semantics; 1.1.1. Preorders; 1.1.2. Posets; 1.1.3. Lattices; 1.1.4. Heyting algebras and Boolean algebras; 1.1.5. Semigroups, monoids and other groupoids; 1.2. Concepts from universal algebra; 1.2.1. Homomorphisms, subalgebras, substructures, direct products; 1.2.2. Congruences; 1.2.3. Free algebras; 1.2.4. More on Heyting and Boolean algebras; 1.2.5. Mal'cev conditions; 1.2.6. Ultraproducts and Jonsson's Lemma 1.2.7. Equational logic 1.2.8. Quasivarieties; 1.3. Logic; 1.3.1. Hilbert calculus for classical logic; 1.3.2. Gentzen's sequent calculus for classical logic; 1.3.3. Calculi for intuitionistic logic; 1.3.4. Provability in Hilbert and Gentzen calculi; 1.4. Logic and algebra; 1.4.1. Validity of formulas in algebras; 1.4.2. Lindenbaum-Tarski algebras; 1.4.3. Algebraization; 1.4.4. Superintuitionistic logics; 1.5. Cut elimination in sequent calculi; 1.5.1. Cut elimination; 1.5.2. Decidability and subformula property; 1.6. Consequence relations and matrices; 1.6.1. Consequence relations 1.6.2. Inference rules 1.6.3. Proofs and theorems; 1.6.4. Matrices; 1.6.5. Examples; 1.6.6. First-order and (quasi)equational logic;

Exercises; Notes; Chapter 2. Substructural logics and residuated lattices; 2.1. Sequent calculi and substructural logics; 2.1.1. Structural rules; 2.1.2. Comma, fusion and implication; 2.1.3. Sequent calculus for the substructural logic FL; 2.1.4. Deducibility and substructural logics over FL; 2.2. Residuated lattices and FL-algebras; 2.3. Important subclasses of substructural logics; 2.3.1. Lambek calculus; 2.3.2. BCK logic and algebras; 2.3.3. Relevant logics
2.3.4. Linear logic 2.3.5. ukasiewicz logic and MV-algebras; 2.3.6. Fuzzy logics and triangular norms; 2.3.7. Superintuitionistic logics and Heyting algebras; 2.3.8. Minimal logic and Brouwerian algebras; 2.3.9. Fregean logics and equivalential algebras; 2.3.10. Overview of logics over FL; 2.4. Parametrized local deduction theorem; 2.5. Hilbert systems; 2.5.1. The systems HFLe and HFL; 2.5.2. Derivable rules; 2.5.3. Equality of two consequence relations; 2.6. Algebraization and deductive filters; 2.6.1. Algebraization; 2.6.2. Deductive filters; Exercises; Notes
Chapter 3. Residuation and structure theory 3.1. Residuation theory and Galois connections; 3.1.1. Residuated pairs; 3.1.2. Galois connections; 3.1.3. Binary residuated maps; 3.2. Residuated structures; 3.3. Involutive residuated structures; 3.3.1. Involutive posets; 3.3.2. Involutive pogroupoids; 3.3.3. Involutive division posets; 3.3.4. Term equivalences; 3.3.5. Constants; 3.3.6. Dual algebras; 3.4. Further examples of residuated structures; 3.4.1. Boolean algebras and generalized Boolean algebras; 3.4.2. Partially ordered and lattice ordered groups
3.4.3. The negative cone of a residuated lattice

Sommario/riassunto

The book is meant to serve two purposes. The first and more obvious one is to present state of the art results in algebraic research into residuated structures related to substructural logics. The second, less obvious but equally important, is to provide a reasonably gentle introduction to algebraic logic. At the beginning, the second objective is predominant. Thus, in the first few chapters the reader will find a primer of universal algebra for logicians, a crash course in nonclassical logics for algebraists, an introduction to residuated structures, an outline of Gentzen-style calculi as