On non-classical polyadic algebras: Soft and Hard

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Abstract

Polyadic algebras, introduced by Paul R. Halmos, provide an algebraic framework for classical first-order logic. Building on generalizations via relation algebras by H. Andréka, I. Németi, I. Sain, and G. Sági, as well as polyadic VB-algebras studied by D. Pigozzi and A. Salibra, various fragments of first-order logic —including Rasiowa's implicative predicate logic— can be algebraically characterized using polyadic algebras. In this talk, we first define polyadic VB-algebras based on algebraically implicative logics. We then establish a functional representation theorem for these polyadic algebras. Finally, we demonstrate how this theorem reveals the connection between the VB-calculus and predicate algebraically implicative logic, thereby linking the "soft" and "hard" approaches to algebraizing first-order logic as advocated by J. M. Font.