

Title	代数的手法による、可換な部分構造論理の研究
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abstract

Substructural logics which are obtained from classical logic or intuitionistic logic by deleting some or all of structural rules have been studied actively in recent years. In proof-theoretical studies of substructural logics, many of important results like the disjunction property and the decidability come out as consequences of the cut elimination theorem. But, when we try to study general properties of substructural logics as a whole, we need to use semantical methods. Recently, algebraic structures called residuated lattices are paid much attention to as a semantics of substructural logics and has been developed much. In this thesis, we investigated logics over \mathbf{FL}_e , which is obtained from the sequent system \mathbf{LJ} for intuitionistic logic by eliminating both the weakening and the contraction rules, and showed the following results by using FL_e -algebras.

When we regard a logic as a set of formulas, the class of all logics over \mathbf{FL}_e forms a bounded lattice whose lattice order is the set inclusion, which has the set of all formulas \mathcal{Fm} and \mathbf{FL}_e as the greatest and the smallest element, respectively. One of our purposes in this thesis is to clarify what structure such a lattice does. Our result says that there exist continuum many maximal elements in the lattice. It means that there exist continuum maximal logics over \mathbf{FL}_e .

It is an important problem how various logical properties of a given logic are characterized as algebraic properties of corresponding variety. Up to now, algebraic characterizations of several logical properties had been given only for modal logics and intermediate logics. So, how these results can be extended to substructural logics has not been clarified yet. Moreover, there were only a few studies which show relations among algebraic properties from a unified standpoint. In this thesis, we gave algebraic characterizations of several logical properties for logics over \mathbf{FL}_e . By using these characterizations, we clarified not only logical relations but also algebraic relations both from a logical and an algebraic standpoint.