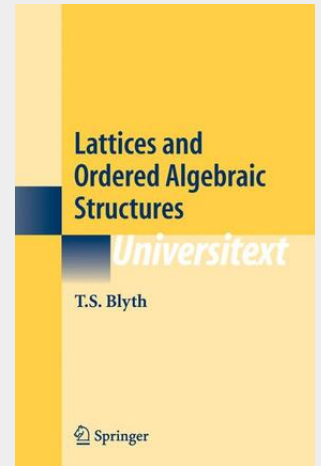Blyth

Lattices and Ordered Algebraic Structures

The notion of an order plays an important role ˆ not only throughout mat-maticsbutalsoinadjacentdisciplinessuchaslogicandcomputerscience. The purpose of the present text is to provide a basic introduction to the theory of ordered structures. Taken as a whole, the material is mainly designed for a postgraduate course. However, since prerequisites are minimal, selected parts of it may easily be considered suitable to broaden the horizon of the advanced undergraduate. Indeed, this has been the author's practice over many years. A basic tool in analysis is the notion of a continuous function, namely a mapping which has the property that the inverse image of an open set is an open set. In the theory of ordered sets there is the corresponding concept of a residuated mapping, this being a mapping which has the property that the inverse image of a principal down-set is a principal down-set. It comes the- fore as no surprise that residuated mappings are important as far as ordered structures are concerned. Indeed, albeit beyond the scope of the present - position, the naturality of residuated mappings can perhaps best be exhibited using categorical concepts. If we regard an ordered set as a small category then an order-preserving mapping f: A? B becomes a functor. Then f is + + residuated if and only if there exists a functor f: B? A such that (f,f) is an adjoint pair.

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