PRIME IDEAL THEOREM
FOR DOUBLE BOOLEAN ALGEBRAS

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To the memory of Professor Kazimierz Glazek

Abstract
Double Boolean algebras are algebras \((D, \cap, \cup, d, p, \bot, \top)\) of type \((2, 2, 1, 1, 0, 0)\). They have been introduced to capture the equational theory of the algebra of protoconcepts. A filter (resp. an ideal) of a double Boolean algebra \(D\) is an upper set \(F\) (resp. down set \(I\)) closed under \(\cap\) (resp. \(\cup\)). A filter \(F\) is called primary if \(F \neq \emptyset\) and for all \(x \in D\) we have \(x \in F\) or \(x^d \in F\). In this note we prove that if \(F\) is a filter and \(I\) an ideal such that \(F \cap I = \emptyset\) then there is a primary filter \(G\) containing \(F\) such that \(G \cap I = \emptyset\) (i.e. the Prime Ideal Theorem for double Boolean algebras).

Keywords: double Boolean algebra, protoconcept algebra, concept algebra, weakly dicomplemented lattices.

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References


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