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PROBLEMS IN BOOLEAN ALGEBRAS

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Let $B = (B, 0, 1, \wedge, \vee, \neg)$ be a Boolean algebra. Let L be a subset of B . L is said to be a discrete set (of B) if and only if L is a set of pairwise incomparable elements of B , i.e. if x and y are distinct members of L such that $x \wedge y = y$, then $x = y$. For instance an antichain of B is a discrete set. There is an uncountable Boolean algebra such that every antichain is countable.

Theorem 1. Assume Martin's axiom. There is a Boolean algebra of power 2^ω such that every discrete set is of power $< 2^\omega$.

Problem 1. Does there is an uncountable Boolean algebra such that all discrete sets and all chains are countable ?

A subset D of B is said to be a *strong generator* of B iff every element of B is the infinite supremum of members of D . A strong generator is a dense subset of B . There is an uncountable Boolean algebra with a countable strong generator.

Theorem 2. Assume C.H. there is an uncountable Boolean algebra with a countable strong generator such that all discrete sets are countable.

Problem 2. Is there an uncountable Boolean algebra with a countable strong generator such that all discrete sets and all chains are countable ?