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ON ALAN DAY'S DOUBLING CONSTRUCTION IN BOOLEAN ALGEBRA

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Abstract: In this paper, we prove that in a Boolean Algebra, doubling of an interval makes it distributive but not Boolean.

Keywords and Phrases: Lattices, boolean algebra, doubling construction in lattices.

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1. Introduction

G. Gratzer in his paper [4] introduced a new lattice L^U from a given lattice L by adding an element a^U called the double of $a \neq 0, 1$ in L where $L^U = L \cup \{a^U\}$ with a new order denoted by $\leq^U$. Following that construction, A. Day [1] introduced a similar construction $L[I]$ by doubling an interval I of a given lattice L. After that it witnessed many developments, e.g. see [2], [3], [6]. In the paper [3] entitled 'Doubling Constructions in Lattice Theory', Alan Day mentioned the following result which appeared in [2]: Let L be a distributive lattice and take $I = [u, v]$ in L, $L[I]$ is again distributive if and only if $L = [u, 1] \cup [0, v]$. The proof there is implicit. For Boolean algebras, we give in this paper an explicit proof.