Abstract

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The present work refers directly to the investigations of Buszkowski and Prucnal [1] and that of Esakia [2], generalizing their results. Our main representation theorem for co-diagonalizable algebras (Theorem 2) is obtained by application of certain methods taken from Jónsson-Tarski [3].

Definition 1. By a derivative algebra (D-algebra in short) we shall mean a system $\langle A, \wedge, \vee, -, 0, d \rangle$ such that

(i) $\langle A, \wedge, \vee, -, 0 \rangle$ is a Boolean algebra,

(ii) $d$ is a unary operation on $A$ satisfying the following conditions:

a) $d(0) = 0$,

b) $d(a \vee b) = d(a) \vee d(b)$,

c) $d(d(a)) \leq d(a)$,

for all $a, b \in A$.

Definition 2. We say that an algebra $\mathcal{M} = \langle A, \wedge, \vee, -, 0, d \rangle$ is a co-diagonalizable algebra (CD-algebra in short) if $\mathcal{M}$ is a D-algebra and, moreover, the operation $d$ satisfies the following Löb’s condition:

$$d(a) = d(a - d(a)).$$

Co-diagonalizable algebras are called by some writers (e.g. Esakia [2]) Magari algebras.
Typical examples of $D$-algebras and $CD$-algebras.

1. Let $X$ be a topological space and let, for any $A \subseteq X$, $d(A)$ be the set of all accumulation points of $A$ (i.e. $d(A)$ is the derivative of $A$). Then $< P(X), \cap, \cup, -, \emptyset, d >$ is a $D$-algebra. It is called the derivative algebra over $X$.

2. Let $X$ be a scattered topological space, i.e., no non-empty subset of $X$ is dense-in-itself. Then $< P(X), \cap, \cup, -, \emptyset, d >$ is a $CD$-algebra (with $d$ defined as above). This algebra is called the $CD$-algebra over $X$ (cf. [2]).

**Theorem 1.** Every derivative algebra is isomorphic with a subalgebra of the derivative algebra over a topological space.

**Theorem 2.** Every $CD$-algebra is isomorphic with a subalgebra of the $CD$-algebra over a scattered topological space.

**References**

