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b-bimorphisms

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Let X be an Archimedean vector lattice. X^\sim denotes the order dual of X and $X^{\sim\sim}$ denotes the order bidual of X . By $(X^\sim)_n^\sim$ we denote the order continuous bidual of X . The canonical mapping σ of X into $X^{\sim\sim}$ is defined by $\sigma(x)(f) = f(x) = x^\sim(f)$ for all $f \in X^\sim$. Here, x^\sim defines an order continuous algebraic lattice homomorphism on X^\sim and canonical image $\sigma(X)$ of X is a subalgebra of $(X^\sim)_n^\sim$. The band generated by $\sigma(X)$ is order dense in the order continuous bidual $(X^\sim)_n^\sim$ of X .

Definition 1. Let X be an Archimedean vector lattice. A bilinear mapping $T : X \times X \rightarrow X$ is called a b -bimorphism if $x \wedge y = 0$ and $x \wedge z = 0$ in X imply $x \wedge T(y, z) = 0$.

Every biorthomorphism is a b -bimorphism by the definition.

Theorem 2. Let X be an Archimedean vector lattice. If $T : X \times X \rightarrow X$ is a b -bimorphism, then the triadjoint of T , $T''' : (X^\sim)_n^\sim \times (X^\sim)_n^\sim \rightarrow (X^\sim)_n^\sim$ is a b -bimorphism.

As a result of this study, we obtain that if A is a b -algebra, then the order continuous bidual of A is a b -algebra. Also, as a special case, the following result is presented, [7]

Corollary 3. If a b -algebra A has positive squares, then the order bidual of A is a b -algebra.

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