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Introducing Quantum-Weijsberg Algebras by Redefining Quantum-MV Algebras: Characterization, Properties, and Other Important Results

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Abstract : We introduce the notion of quantum-Wajsberg algebras by redefining the quantum-MV algebras starting from involutive BE algebras. We give a characterization of quantum-Wajsberg algebras, investigate their properties, and show that, in general, quantum-Wajsberg algebras are not (commutative) quantum-B algebras. We also define the v-commutative quantumWajsberg algebras and study their properties. Furthermore, we prove that any Wajsberg algebra (bounded v-commutative BCK algebra) is a quantum-Wajsberg algebra, and we give a condition for a quantum-Wajsberg algebra to be a Wajsberg algebra. We prove that Wajsberg algebras are both quantum-Wajsberg algebras and commutative quantum-B algebras. We establish the connection between quantum-Wajsberg algebras and quantum-MV algebras, proving that the quantum-Wajsberg algebras are definitionally equivalent to quantum-MV algebras. We show that, in general, the quantum-Wajsberg algebras are not commutative quantum-B algebras, and if a quantum-Wajsberg algebra is self-distributive, then the corresponding quantum-MV algebra is an MV algebra.

Keywords : quantum-Wajsberg algebra, quantum-MV algebra, MV algebra, Wajsbergalgebra, BE algebra, quantum-B algebra
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