Fractal contruction of an atomic Archimedean lattice effect algebra with non-atomic subalgebra of sharp elements

Vladimír Olejček

Department of Mathematics, Institute of Computer Science and Mathematics, Faculty of Electrical Engineering and Information Technology, Slovak University of Technology, Ilkovič ova 3, 81219 Bratislava, Slovakia
vladimir.olejcekstuba.sk

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In connection with existence of states on lattice effect algebra properties of the subalgebra $S(E)$ of sharp elements and the subalgebra $C(E)$ of central elements are studied. In particular, Z. Riečanová in [2] formulated a sufficient condition under which $S(E)$ and $C(E)$ in an atomic Archimedean lattice effect algebra are atomic. Z. Riečanová in [3] described the structure of an Archimedean atomic lattice effect algebras in which $C(E) = S(E)$. In [4], as well as at several presentations, Z. Riečanová formulated a problem whether there exists an atomic lattice effect algebra with non-atomic subalgebra $S(E)$ of sharp elements. In [2] we gave an affirmative answer to this question. In particular, we presented an example of atomic (non-Archimedean) MV algebra with non-atomic subalgebra of $S(E) = C(E)$ of central or sharp elements. However, the above problem remained open for Archimedean atomic lattice effect algebras. In this contribution we solve the problem affirmatively, i.e. we construct an atomic Archimedean lattice effect algebra with a non-atomic subalgebra of sharp elements.

References

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