

Subinterval algebras and algebraic constructions

Marek Hyčko

Mathematical Institute, Slovak Academy of Sciences
Štefánikova 49, SK-81473 Bratislava, Slovakia

E-mail: `hycko@mat.savba.sk`

Abstract

Subinterval algebras, i.e. algebras defined on non-empty subintervals of BL-algebras, pseudo BL-algebras and residuated ℓ -monoids were introduced in [4]. In connection to the representation theorem of BL-algebras as subdirect product of chains [6, 1], the special subclasses of BL-algebras were introduced, namely Łukasiewicz, product and Gödel BL-algebras. We investigate whether forming a subinterval algebra of a Łukasiewicz (linear product, Gödel) BL-algebra is again Łukasiewicz (linear product, Gödel), respectively. The similar research is performed to the non-commutative case, i.e. pseudo BL-algebras (introduced by [2, 3]) and non-commutative residuated ℓ -monoids (introduced by [5]). Moreover, the properties of subinterval algebras with respect to some algebraic constructions are treated, namely direct and subdirect products, Hájek's and Agliano-Montagna's type of ordinal sums. Considering dually residuated ℓ -monoids (introduced in [7]) the construction of a subinterval algebra and underlying results can be simply defined by the use of duality.

References

- [1] R. Cignoli, F. Esteva, L. Godo, A. Torrens, *Basic fuzzy logic in the logic of continuous t -norms and their residua*, *Soft Computing* **4** (2000), 106–112.
- [2] A. Di Nola, G. Georgescu, A. Iorgulescu, *Pseudo BL-algebras: Part I*, *Multi. Val. Logic* **8** (2002), 673–714.
- [3] A. Di Nola, G. Georgescu, A. Iorgulescu, *Pseudo BL-algebras: Part II*, *Multi. Val. Logic* **8** (2002), 717–750.
- [4] A. Dvurečenskij, M. Hyčko, *Subinterval algebras of BL-algebras, pseudo BL-algebras and bounded residuated ℓ -monoids*, *Math. Slovaca* **56**(2) (2006), 125–144.
- [5] A. Dvurečenskij, J. Rachůnek, *Probabilistic averaging in bounded $R\ell$ -monoids*, *Semigroup Forum* **72** (2006), 190–206.
- [6] P. Hájek, *Basic fuzzy logic and BL-algebras*, *Soft Computing* **2** (1998), 124–128.
- [7] K. L. N. Swamy, *Dually residuated lattice ordered semigroups*, *Math. Ann.* **159** (1965), 105–114.