A latticial study of complete hypergroups

Andromeda Cristina Sonea
Department of Mathematics, University Alexandru Ioan Cuza,
Bld. Carol I, no. 11, Iaşi, Romania
soneaandromeda@yahoo.com

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Abstract

The dihedral group represents a group of symmetries of a regular polygon. Moreover, it is generated by rotation and axial symmetries. Due to this structure, in a recently published paper we analyzed the HX-groups associated with them and we computed the commutativity degree of the associated HX-groups. Since there is an interesting connection between the HX-groups and the complete hypergroups- both of them can be constructed using the structure of a group, in this paper we aim to determine the relationships between the lattice of the dihedral group and the lattice of the associated HX-groups, as well as that of the associated complete hypergroups. Furthermore, we will present some conditions to describe the modular and the distributive lattices, using elements from hypercompositional algebra. This has the advantage that the interaction called hyperproduct or hyperoperation between two elements of the considered set is not anymore just an element, as in the classical algebra, but a subset of the support set.