1154-06-2013 **Nikolaos Galatos** (ngalatos@du.edu), University of Denver, **Peter Jipsen*** (jipsen@chapman.edu), Chapman University, **Olim Tuyt** (olim.tuyt@math.unibe.ch), University of Bern, and **Diego Valota** (valota@di.unimi.it), University of Milan. *The structure of idempotent involutive residuated lattices and weakening relation algebras.*

In joint research with Olim Tuyt and Diego Valota we have obtained a full description of all finite commutative idempotent involutive residuated lattices. The multiplicative order of these algebras is a distributive semilattice that is a disjoint union of Boolean algebras, with involution as complementation within each Boolean algebra. The top elements of the Boolean algebras form a distributive lattice, and given this family of Boolean algebras indexed by the distributive lattice, there is an algorithm for reconstructing the original residuated lattice.

With Nick Galatos we prove a characterization of the congruence filters of generalized bunched implication algebras (GBI-algebras = residuated Brouwerian algebras). Weakening relation algebras are cyclic involutive residuated Heyting algebras in which the congruence filters have a simpler description. We show that all representable weakening relation algebras are subalgebras of double-division conucleus images of representable relation algebras, and that this construction preserves a certain discriminator term. As a result, the class of representable weakening relation algebras forms a discriminator variety of cyclic involutive GBI-algebras, and we also obtain a discriminator variety of abstract weakening relation algebras. (Received September 17, 2019)