Apart algebras

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Abstract

Sambin and Ciraulo developed the theory of overlap algebras as an algebraic generalisation of the overlap relation between subsets. Overlap algebras correspond classically to complete Boolean algebras and intuitionistically to complete Heyting algebras. We introduce apart algebras as an algebraic generalisation of the apart relation between subsets. The duality between the overlap and the apart relation between subsets is extended to the duality between the theory of overlap and apart algebras. While overlap algebras induce a canonical positivity predicate and are formal topologies, apart algebras induce a canonical negativity predicate and are formal cotopologies. While the regular elements of an overlap topology form an overlap algebra, the coregular elements of an apart topology form an apart algebra.