TRESHOLD CONVEXITY AND BARYCENTRIC ALGEBRAS

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ABSTRACT. Convex sets may be viewed as algebras equipped with a set of binary convex combinations that is indexed by the open unit interval of real numbers. Convex sets generate the variety of barycentric algebras, which also includes semilattices where the semilattice multiplication is repeated uncountably many times. Barycentric algebras are defined by three axioms: idempotence, skew-commutativity, and skew-associativity. Since the skew-associativity axiom is rather complicated, Klaus Keimel has asked whether it can simply be replaced by the entropic law. It turns out that the answer is negative. The counterexamples presented and studied in this paper are known as *threshold barycentric algebras*, depending on a *threshold* taken from the left-hand side of the closed unit interval. They offer an entire spectrum of algebras, ranging from barycentric algebras for threshold 0 to commutative idempotent entropic groupoids for threshold 1/2.

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