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Title: Closure Operations on Ideals in Commutative Rings

Abstract: A closure operation is an idempotent endomorphism on the set of ideals of a given [commutative Noetherian] ring, which produces an ideal that contains the given ideal, and preserves containment of ideals. If defined element-wise, a closure operation can be seen as a necessary condition for membership in an ideal. I will discuss various closure operations (e.g. integral closure, tight closure, and continuous closure), as well as some of their properties, how they arise, and criteria for containment. I will discuss the related notions of (1) (minimal) reduction with respect to a closure and (2) special parts of closures, including a tie-in with matroid theory. Much of this work is joint with various collaborators (Yao, Hochster, Brennan, and Vraciu).