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Closure operators and their duals

Categorical closure operators have been studied for almost three decades now (see in particular the monographs by Dikranjan-Tholen and Castellini on this subject) and may be regarded as an essential tool not only in categorical topology and sheaf- and topos theory, but also in algebra, order and domain theory. What is the dual notion of closure operator? When dualized from a merely order-theoretic perspective, one arrives at Vorster's notion of interior operator (S. J. Vorster, Quaestiones Mathematicae 23 (2000) 405-416) which has found renewed interest in recent papers by Castellini, Holgate and Slapal. However, when the relevant subobject lattices are complemented, all interior operators are induced by closure operators, so that truly novel applications of the notions are to be found only beyond the realm of set-based topological categories. In this talk we work with a general definition of closure operator which lends itself easily to categorical dualization. We present the basics of the theory of dual closure operators and give a variety of examples from algebra and topolgy.

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