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Extending semilattices to frames

Each (bounded) meet-semilattice S is well known to be freely extended to its downset frame $\mathfrak{D}S$. This extension, of course, does not respect the possible joins, and the question naturally arises when and how one can extend the semilattice to a frame preserving a given part of the existing join structure. Using the Johnstone's technique of coverages and sites, and a deep injectivity result by Bruns and Lakser one can show that the range of frame extensions of S is a sub-coframe (indeed an interval) of the coframe of the sublocales of $\mathfrak{D}S$, with the injective envelope of S as the bottom.

We will also briefly mention the relation of the extensions and the Dedekind-MacNeille completion, and a few further aspects of the construction involved.