Title: Generalized reflections and derived equivalences of posets

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Abstract: A finite partially ordered set (poset) X carries a natural structure of a topological space. This allows us to identify, for any abelian category A, sheaves over X (with values in A) and commutative diagrams (over A) whose shape is the Hasse diagram of X. When A is the category of vector spaces over a field, these can also be identified with right modules over the incidence algebra of X, thus providing a link with the representation theory of algebras.

We say that two posets are derived equivalent if their bounded derived categories of sheaves are equivalent as triangulated categories. This leads to an equivalence relation between posets, which is strictly coarser than isomorphism, but still fine enough to be interesting. However, there is no known algorithm that determines for two posets whether they are derived equivalent or not.

I will start by explaining the above notions and briefly discussing combinatorial invariants of derived equivalence, that is, properties of a poset that are shared by all other posets derived equivalent to it. Then I will present several constructions that systematically produce, given a poset, new posets derived equivalent to it. The common theme of these constructions is the structured reversal of order relations.

One of these constructions consists of new generalized reflection operations, which are used to prove that a poset and its reflection are derived equivalent. I will describe these generalized reflections in explicit combinatorial terms and show how they generalize the usual Bernstein-Gelfand-Ponomarev reflection functors originally introduced for the representations of quivers.