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Persistence and Triangulated Categories

The relatively new theory of Persistence Modules has seen many applications throughout geometry and topology, in particular in areas of Symplectic Geometry. In 2020 P.Biran, O.Cornea and J.Zhang introduced the notion of triangulated persistence categories (TPCs), a machinery which fits together well the theory of persistence modules with the study of geometric objects via triangulated categories.

It is common for Geometry to give rise to a Triangulated Category. However, we often forget additional data. We can recover some of this using a notion of 'persistence refinements', in which we construct a category with Hom-sets forming persistence modules and which, after localisation by a certain class of morphisms, recovers our original category. Interestingly, the combination of the persistence refinements with the triangulated structure produces a family of (pseudo)metrics on the objects of our category. These metrics and their corresponding topology seem to behave well with the underlying geometry.

The aim of this talk is to give an overview on this subject and to also discuss an algebraic problem motivated by homological mirror symmetry; how to extend these metrics to the Karoubi completion.