

Derived Categories

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Abstract

Derived categories are of main interest in homological algebra as they offer, for instance, the natural setting where to define the derived functors. They are defined starting from an abelian category $\mathcal{A}$ and inverting the quasi-isomorphism in the homotopy category $\mathcal{K}(\mathcal{A})$.

The aim of this seminar is to give a first introduction to the study of derived categories. We will see in detail how they can be defined, their triangulated structure and some of the main properties. We will also look through some examples, in particular we will see how the derived category is fully characterized when the abelian category we start from is hereditary or semisimple.

References

1. D. Milicic, *Lectures on Derived Categories*
2. R. Hartshorne, *Residues and Duality*, Lecture Notes in Mathematics, 1966
3. H. Krause, *Derived categories, resolutions, and Brown representability*, Amer. Math. Soc., 2007