Introduction to Homological Algebra and Derived Categories

(4 Lectures)

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My lectures will provide the necessary homological algebra and categorical background for noncommutative geometry and other lectures in the first week.

Lecture1: A quick review of projective schemes (we go over some basic facts about projective, commutative, schemes and ample line bundles on them. This is a prerequisite for Mahanta's lectures on noncommutative algebraic geometry.)

Lecture 2: Abelian/additive categories + examples (emphasizing on categories of R-moduels and of quasi-coherent sheaves);

Lecture 3: Operations on chain complexes, derived categories, derived functors;

Lecture 4: -Triangulated categories, t-structures.