

Classifying torsionfree classes of the category of coherent sheaves and their Serre subcategories

Friday, 22 December 2023 11:00 (30 minutes)

The classification of subcategories is one of the long-studied topics in the representation theory of algebras. The most classical result is Gabriel's classification of Serre subcategories (i.e., subcategories closed under taking subobjects, quotients, and extensions). He classified the Serre subcategories of the category of coherent sheaves on a noetherian scheme by using specialization-closed subsets of the scheme. In the case of the module category over a commutative noetherian ring, various subcategories such as torsion classes (= subcategories closed under taking quotients and extensions) and torsion-free classes (= subcategories closed under subobjects and extensions) are classified.

In this talk, we will talk about an extension of these classification results to the category of coherent sheaves. A naive extension does not hold even in the case of projective lines. Therefore, we consider subcategories closed under tensoring with line bundles and show that by imposing this condition, various subcategories of the category of coherent sheaves can be classified in the same way as in the case of the module category. Using these classifications, we also classify the Serre subcategories of the category of torsion-free sheaves over a reduced projective curve.

Presenter: SAITO, Shunya (Nagoya)