The 14th Seminar on
Commutative Algebra and Related Topics, January 3 and 4, 2018
School of Mathematics, IPM, Tehran

Morita Theory for Derived Categories of Functor Categories

Razieh Vahed
Khansar Faculty of Mathematics and Computer Science
Iran

Tilting theory is initiated from representation theory of finite dimensional algebras, with origins in the work of Bernšteĭn, Gel'fand and Ponomarev [BGP]. It is known that tilting theory can be viewed as a generalization of classical Morita theory.

In this direction, one of the most beautiful results is the Rickard's theorem [Ric, Theorem 6.4] that characterizes all rings that are derived equivalent to a given ring A by determining all tilting complexes over A.

On the other hand, functor categories were introduced in representation theory by Auslander [A1, A2]. He used this kind of categories to classify artin algebras of finite representation type as well as to prove the first Brauer-Thrall conjecture.

Let Mod-$\mathcal{S}$ denote the category of $\mathcal{S}$-modules, where $\mathcal{S}$ is a small category. In this talk, we investigate Morita theory of derived categories over Mod-$\mathcal{S}$. This will have several interesting applications.

This talk is based on a joint work with J. Asadollahi and R. Hafezi.

References

[A1] M. Auslander, *Representation theory of artin algebras I,* Comm. Algebra **1** (3) (1974), 177-268.

[A2] M. Auslander, *Representation dimension of artin algebras,* Queen Mary College notes, 1971.

[BGP] I. N. Bernšteĭn, I. M. Gel'fand, V. A. Ponomarev, *Coxeter functors and Gabriel's theorem,* Uspehi Mat. Nauk, **28** (1973), 19-33.

[Ric] J. Rickard, *Morita theory for derived categories,* J. Lond. Math. Soc. **39** (1989), 436-456.