Translation Functors of Categories O for Root-Reductive Lie Algebras

Abstract:

Root-reductive Lie algebras form a special type of reasonably well behaved infinite-dimensional Lie algebras. In this talk, we shall define a version of Bernstein-Gelfand-Gelfand categories O for root-reductive Lie algebras, which we called extended categories O and briefly discuss some properties of these categories. Let g be a rootreductive Lie algebra containing a splitting Borel subalgebra b satisfying a special additional condition called the Dynkin condition. The extended category O corresponding to g and b is denoted by \( \mathcal{O}/b\).

The category \( \mathcal{O}/b\) can be decomposed analogously to the finite-dimensional cases into blocks. The main object of this talk is to give a construction of translation functors of \( \mathcal{O}/b\). Then we shall see that some objects such as tilting modules arise by applying the translation functors to Verma modules just as in the finite-dimensional cases. Furthermore, the translation functors establish equivalences between some blocks of the category \( \mathcal{O}/b\).