"Graded modules over simple Lie algebras with a group grading"

Abstract:

Gradings on Lie algebras by various abelian groups arise in the theory of symmetric spaces, Kac-Moody algebras, and color Lie superalgebras. In the 1960s, V. Kac classified all gradings by cyclic groups on finite-dimensional simple Lie algebras over complex numbers. Recently, there has been considerable progress in the classification of gradings by arbitrary abelian groups on finite-dimensional simple Lie algebras over algebraically closed fields. Given a G-grading on such a Lie algebra L, it is natural to study G-graded L-modules. In characteristic 0, any finite-dimensional graded L-module is a direct sum of simple graded L-modules. We will describe finite-dimensional simple graded L-modules (using a version of Clifford Theory) and consider the following related problem: which of the finite-dimensional L-modules admit G-gradings making them graded modules?