



## Representations of Semisimple Lie Algebras in the BGG Category O (Hardback)

By James E. Humphreys

American Mathematical Society, United States, 2008. Hardback. Book Condition: New. 262 x 185 mm. Language: English . Brand New Book. This is the first textbook treatment of work leading to the landmark 1979 Kazhdan-Lusztig Conjecture on characters of simple highest weight modules for a semisimple Lie algebra  $\mathfrak{g}$  over  $\mathbb{C}$ . The setting is the module category  $\mathcal{O}$  introduced by Bernstein-Gelfand-Gelfand, which includes all highest weight modules for  $\mathfrak{g}$  such as Verma modules and finite dimensional simple modules. Analogues of this category have become influential in many areas of representation theory. Part I can be used as a text for independent study or for a mid-level one semester graduate course; it includes exercises and examples. The main prerequisite is familiarity with the structure theory of  $\mathfrak{g}$ . Basic techniques in category  $\mathcal{O}$  such as BGG Reciprocity and Jantzen's translation functors are developed, culminating in an overview of the proof of the Kazhdan-Lusztig Conjecture (due to Beilinson-Bernstein and Brylinski-Kashiwara). The full proof however is beyond the scope of this book, requiring deep geometric methods:  $D$ -modules and perverse sheaves on the flag variety. Part II introduces closely related topics important in current research: parabolic category...



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