

FDITE12 Lie algebras in physics 2

lecturer: Laszlo Feher

Topics:

Weyl groups of Lie algebras. Lie algebra automorphisms. Affine Lie algebras as central extensions of loop algebras, Virasoro algebra. Finite dimensional irreducible representations of simple Lie algebras. General theory of highest weight modules. Verma modules, Casimir operators, character formulas. Tensor product, Clebsch-Gordan coefficients, tensor operators, invariant tensors. Young tableaux. Subalgebras of semisimple Lie algebras. Representations on spaces of functions (Peter-Weyl theorem, connection between special functions and Lie groups). Short introduction to supersymmetry and to Hopf algebras (quantum groups).

Recommended literature:

- de Kerf E. A. et al: Lie Algebras, Parts I and II, Volumes 1 and 7 in Studies in Mathematical Physics, North-Holland, 1994 and 1997
- Fuchs J., Schweigert C.: Symmetries, Lie Algebras and Representations, CUP, Cambridge, 1997