

1. Record Nr.	UNINA9910825441603321
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Titolo	Lectures on infinite-dimensional Lie algebra // Minoru Wakimoto
Pubbl/distr/stampa	River Edge, N.J., : World Scientific, 2001
ISBN	9786611956356 1-281-95635-X 981-281-070-6
Edizione	[1st ed.]
Descrizione fisica	x, 444 p
Disciplina	512/.482
Soggetti	Infinite dimensional Lie algebras Lie algebras
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references (p. 429-440) and index.
Nota di contenuto	1. Preliminaries on affine Lie algebras. 1.1. Affine Lie algebras. 1.2. Extended affine Weyl group. 1.3. Some formulas for finite-dimensional simple Lie algebras -- 2. Characters of integrable representations. 2.1. Weyl-Kac character formula. 2.2. Specialized characters. 2.3. Product expression of characters. 2.4. Modular transformation -- 3. Principal admissible weights. 3.1. Admissible weights. 3.2. Principal admissible weights. 3.3. Characters of principal admissible representations. 3.4. Parametrization of principal admissible weights. 3.5. Modular transformation -- 4. Residue of principal admissible characters. 4.1. Non-degenerate principal admissible weights. 4.2. Modular transformation of residue. 4.3. Fusion coefficients -- 5. Characters of affine orbifolds. 5.1. Characters of finite groups. 5.2. Fusion datum. 5.3. Characters of affine orbifolds -- 6. Operator calculus. 6.1. Operator products. 6.2. Boson-fermion correspondence -- 7. Branching functions. 7.1. Virasoro modules. 7.2. Virasoro modules of central charge-[symbol]. 7.3. Branching functions. 7.4. Tensor product decomposition -- 8. W-algebra. 8.1. Free fermionic fields [symbol](z) and [symbol](z). 8.2. Free fermionic fields [symbol](z) and [symbol](z). 8.3. Ghost field associated to a simple Lie algebra. 8.4. BRST complex. 8.5. Euler-Poincaré characteristics -- 9. Vertex representations for affine Lie algebras. 9.1. Simple examples of vertex operators. 9.2. Basic

representations of $sl(2, \mathbb{C})$. 9.3. Construction of basic representation -- 10. Soliton equations. 10.1. Hirota bilinear differential operators. 10.2. KdV equation and Hirota bilinear differential equations. 10.3. Hirota equations associated to the basic representation. 10.4. Non-linear Schrödinger equations.

Sommario/riassunto

The representation theory of affine Lie algebras has been developed in close connection with various areas of mathematics and mathematical physics in the last two decades. There are three excellent books on it, written by Victor G. Kac. This book begins with a survey and review of the material treated in Kac's books. In particular, modular invariance and conformal invariance are explained in more detail. The book then goes further, dealing with some of the recent topics involving the representation theory of affine Lie algebras. Since these topics are important not only in themselves but also in their application to some areas of mathematics and mathematical physics, the book expounds them with examples and detailed calculations.
