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7. V. G. Kac and D. H. Peterson, “Spin and Wedge Representations of Infinite-Dimensional Lie Algebras and Groups”, <i>Proc. Natl. Acad. Sci. USA</i> <b>78</b> (1981) 3308–3312.	263
8. I. B. Frenkel, “Two Constructions of Affine Lie Algebra Representations and Boson-Fermion Correspondence in Quantum Field Theory”, <i>J. Funct. Anal.</i> <b>44</b> (1981) 259–327.	268

9. B. L. Feigin and D. B. Fuks, “Invariant Skew-Symmetric Differential Operators on the Line and Verma Modules over the Virasoro Algebra”, *Funct. Anal. Appl.* **16** (1982) 114–126. 340
10. A. Rocha-Caridi, “Vacuum Vector Representations of the Virasoro Algebra”, in *Vertex Operators in Mathematics and Physics*, MSRI Publication #3 (Springer, Heidelberg, 1984) 451–473. 353
11. D. Friedan, Z. Qiu and S. Shenker, “Conformal Invariance, Unitarity, and Critical Exponents in Two Dimensions”, *Phys. Rev. Lett.* **52** (1984) 1575–1578. 376
12. D. Friedan, Z. Qiu and S. Shenker, “Details of the Non-Unitarity Proof for Highest Weight Representations of the Virasoro Algebra”, *Commun. Math. Phys.* **107** (1986) 535–542. 380
13. P. Goddard, A. Kent and D. Olive, “Unitary Representations of the Virasoro and Super-Virasoro Algebras”, *Commun. Math. Phys.* **103** (1986) 105–119. 388
14. W. Boucher, D. Friedan and A. Kent, “Determinant Formulae and Unitarity for the  $N = 2$  Superconformal Algebras in Two Dimensions or Exact Results on String Compactification”, *Phys. Lett.* **172B** (1986) 316–322. 403

**Chapter 5 — CONFORMAL SYMMETRY**

15. A. A. Belavin, A. M. Polyakov and A. B. Zamolodchikov, “Infinite Conformal Symmetry in Two-Dimensional Quantum Field Theory”, *Nucl. Phys.* **B241** (1984) 333–380. 413
16. J. L. Cardy, “Operator Content of Two-Dimensional Conformally Invariant Theories”, *Nucl. Phys.* **B270** [FS16] (1986) 186–204. 461

**Chapter 6 — THE WEISS-ZUMINO MODEL**

17. E. Witten, “Non-Abelian Bosonization in Two Dimensions”, *Commun. Math. Phys.* **92** (1984) 455–472. 483
18. V. G. Knizhnik and A. B. Zamolodchikov, “Current Algebra and Wess-Zumino Model in Two Dimensions”, *Nucl. Phys.* **B247** (1984) 83–103. 501
19. P. Goddard, W. Nahm and D. Olive, “Symmetric Spaces, Sugawara’s Energy Momentum Tensor in Two Dimensions and Free Fermions”, *Phys. Lett.* **160B** (1985) 111–116. 522

20. I. B. Frenkel, J. Lepowsky and A. Meurman, “An Introduction to the Monster”, in *Unified String Theories*, ed. M. Green and D. Gross (World Scientific, Singapore, 1986) 533–546.
21. I. B. Frenkel, J. Lepowsky and A. Meurman, “A Moonshine Module for the Monster”, in *Vertex Operators in Mathematics and Physics*, MSRI Publication #3 (Springer, Heidelberg, 1984) 231–273.

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