

References

- [1] T. Abe, G. Buhl and C. Dong, ‘Rationality, regularity and C_2 co-finiteness’, *Trans. Amer. Math. Soc.* **356** (2004) 3391–402.
- [2] D. Adamović and A. Milas, ‘Vertex operator algebras associated to modular invariant representations for $A_1^{(1)}$ ’, *Math. Res. Lett.* **2** (1995) 563–75.
- [3] I. Affleck, ‘Universal term in the free energy at a critical point and the conformal anomaly’, *Phys. Rev. Lett.* **56** (1986) 746–8.
- [4] S. Agnihotri and C. Woodward, ‘Eigenvalues of products of unitary matrices and quantum Schubert calculus’, *Math. Res. Lett.* **5** (1998) 817–36.
- [5] O. Aharony, S. Gubser, J. Maldacena, H. Ooguri and Y. Oz, ‘Large N field theories, string theory and gravity’, *Phys. Rep.* **323** (2000) 183–386.
- [6] D. Alexander, C. Cummins, J. McKay and C. Simons, ‘Completely replicable functions’, *Groups, Combinatorics and Geometry (Durham, 1990)* (Cambridge, Cambridge University Press, 1992) 87–98.
- [7] D. Altschuler, P. Ruelle and E. Thiran, ‘On parity functions in conformal field theories’, *J. Phys. A: Math. Gen.* **32** (1999) 3555–70.
- [8] O. Alvarez, ‘Theory of strings with boundaries: fluctuations, topology and quantum geometry’, *Nucl. Phys.* **B216** (1983) 125–84.
- [9] L. Alvarez-Gaumé, G. Moore and C. Vafa, ‘Theta functions, modular invariance and strings’, *Commun. Math. Phys.* **106** (1986) 1–40.
- [10] H. H. Anderson and J. Paradowski, ‘Fusion categories arising from semi-simple Lie algebras’, *Commun. Math. Phys.* **169** (1995) 563–88.
- [11] J. W. Anderson, *Hyperbolic Geometry* (London, Springer, 1999).
- [12] E. Arbarello and C. DeConcini, ‘On a set of equations characterising Riemann surfaces’, *Ann. Math.* **120** (1984) 119–40.
- [13] E. Arbarello, C. DeConcini, V. G. Kac and C. Procesi, ‘Moduli spaces of curves and representation theory’, *Commun. Math. Phys.* **117** (1988) 1–36.
- [14] E. Ardonne, P. Bouwknegt and P. Dawson, ‘K-matrices for 2D conformal field theories’, *Nucl. Phys. B* **660** (2003) 473–531.
- [15] V. I. Arnold, *Mathematical Methods of Classical Mechanics* (New York, Springer, 1978).
- [16] V. I. Arnold, *Catastrophe Theory*, 2nd edn (Berlin, Springer, 1997).
- [17] V. I. Arnold, ‘From Hilbert’s superposition problem to dynamical systems’, *The Arnoldfest (Toronto, 1997)*, Fields Inst. Commun. **24** (Providence, American Mathematical Society, 1999) 1–18.
- [18] V. I. Arnold, ‘Symplectization, complexification and mathematical trinities’, *The Arnoldfest (Toronto, 1997)*, Fields Inst. Commun. **24** (Providence, American Mathematical Society, 1999) 23–37.
- [19] V. I. Arnold, V. V. Gorynuov, O. V. Lyashko and V. A. Vasil’ev, *Singularity Theory I* (Berlin, Springer, 1998).
- [20] J. Arthur, ‘The trace formula and Hecke operators’, *Number Theory, Trace Formulas and Discrete Groups (Oslo, 1987)* (Boston, Academic Press, 1989) 11–27.
- [21] M. G. Aschbacher, ‘Finite groups acting on homology manifolds’, *Olga Taussky-Todd: in Memoriam, Pacific J. Math. Special Issue* (Berkeley, Pacific Journal of Mathematics, 1997) 3–36.
- [22] M. Aschbacher, ‘The status of the classification of the finite simple groups’, *Notices Amer. Math. Soc.* **51** (2004) 736–40.
- [23] T. Asai, ‘The reciprocity of Dedekind sums and the factor set for the universal covering group of $\mathrm{SL}_2(\mathbb{R})$ ’, *Nagoya Math. J.* **37** (1970) 67–80.

- [24] M. Atiyah, ‘The logarithm of the Dedekind η -function’, *Math. Ann.* **278** (1987) 335–80.
- [25] M. Atiyah, *The Geometry and Physics of Knots* (Cambridge, Cambridge University Press, 1990).
- [26] H. Awata and Y. Yamada, ‘Fusion rules for the fractional level $\widehat{sl(2)}$ algebra’, *Mod. Phys. Lett. A* **7** (1992) 1185–95.
- [27] J. A. de Azcárraga and J. M. Izquierdo, *Lie Groups, Lie Algebras, Cohomology and Some Applications in Physics* (Cambridge, Cambridge University Press, 1995).
- [28] J. C. Baez, ‘Higher-dimensional algebra and Planck-scale physics’, *Physics Meets Philosophy at the Planck Scale* (Cambridge, Cambridge University Press, 2001) 177–95.
- [29] J. C. Baez, ‘The octonions’, *Bull. Amer. Math. Soc.* **39** (2002) 145–205.
- [30] J. C. Baez and J. Dolan, ‘From finite sets to Feynman diagrams’, *Mathematics Unlimited – 2001 and Beyond* (Berlin, Springer, 2001) 29–50.
- [31] F. A. Bais, P. van Driel and M. de Wild Propitius, ‘Anyons in discrete gauge theories with Chern–Simons terms’, *Nucl. Phys.* **393** (1993) 547–70.
- [32] B. Bakalov and A. Kirillov, Jr., *Lectures on Tensor Categories and Modular Functors* (Providence, American Mathematical Society, 2001).
- [33] E. Bannai, ‘Association schemes and fusion algebras (an introduction)’, *J. Alg. Combin.* **2** (1993) 327–44.
- [34] P. Bántay, ‘Orbifolds, Hopf algebras and the Moonshine’, *Lett. Math. Phys.* **22** (1991) 187–94.
- [35] P. Bántay, ‘Algebraic aspects of orbifold models’, *Int. J. Mod. Phys.* **A9** (1994) 1443–56.
- [36] P. Bántay, ‘Higher genus moonshine’, *Moonshine, the Monster, and Related Topics (South Hadley, 1994)*, Contemp. Math. **193** (Providence, American Mathematical Society, 1996) 1–8.
- [37] P. Bántay, ‘The kernel of the modular representation and the Galois action in RCFT’, *Commun. Math. Phys.* **233** (2003) 423–38.
- [38] D. Bar-Natan, ‘On the Vassiliev knot invariants’, *Topol.* **34** (1995) 423–72.
- [39] D. Bar-Natan, ‘On associators and the Grothendieck–Teichmüller group, I’, *Selecta Math. (N.S.)* **4** (1998) 183–212.
- [40] D. Bar-Natan, T. Q. T. Le and D. P. Thurston, ‘Two applications of elementary knot theory to Lie algebras and Vassiliev invariants’, *Geom. Topol.* **7** (2003) 1–31.
- [41] H. Barcelo and A. Ram, ‘Combinatorial representation theory’, *New Perspectives in Algebraic Combinatorics (Berkeley, 1996–97)* (Cambridge, Cambridge University Press, 1999) 23–90.
- [42] K. Bardacki and M. Halpern, ‘New dual quark models’, *Phys. Rev.* **D3** (1971) 2493–509.
- [43] J. Barge and E. Ghys, ‘Cocycles d’Euler et de Maslov’, *Math. Ann.* **294** (1992) 235–65.
- [44] V. Bargmann, ‘Irreducible unitary representations of the Lorentz group’, *Ann. Math.* **48** (1947) 568–640.
- [45] I. G. Bashmakova, *Diophantus and Diophantine Equations* (Washington, Mathematical Association of America, 1997).
- [46] M. Bauer, A. Coste, C. Itzykson and P. Ruelle, ‘Comments on the links between SU(3) modular invariants, simple factors in the Jacobian of Fermat curves, and rational triangular billiards’, *J. Geom. Phys.* **22** (1997) 134–89.
- [47] R. E. Behrend, P. A. Pearce, V. B. Petkova and J.-B. Zuber, ‘Boundary conditions in rational conformal field theories’, *Nucl. Phys.* **B579** (2000) 707–73.
- [48] A. A. Beilinson and V. Drinfel’d, *Chiral Algebras* (Providence, American Mathematical Society, 2004).
- [49] A. A. Beilinson and V. V. Schechtman, ‘Determinant bundles and Virasoro algebras’, *Commun. Math. Phys.* **118** (1988) 651–701.
- [50] A. A. Belavin, A. M. Polyakov and A. B. Zamolodchikov, ‘Infinite conformal symmetry in two-dimensional quantum field theory’, *Nucl. Phys.* **B241** (1984) 33–380.
- [51] G. M. Bergman, ‘Everybody knows what a Hopf algebra is’, *Group Actions on Rings (Brunswick, 1984)*, Contemp. Math. **43** (Providence, American Mathematical Society, 1985) 25–48.
- [52] N. Berline, E. Getzler and M. Vergne, *Heat Kernels and Dirac Operators* (Berlin, Springer, 1992).
- [53] S. Berman and Y. Billig, ‘Irreducible representations for toroidal Lie algebras’, *J. Alg.* **221** (1999) 188–231.
- [54] S. Berman, Y. Billig and J. Szmigielski, ‘Vertex operator algebras and the representation theory of toroidal algebras’, *Recent Developments in Infinite-Dimensional Lie Algebras and Conformal Field Theory (Charlottesville, 2000)*, Contemp. Math. **297** (Providence, American Mathematical Society, 2002) 1–26.

- [55] S. Berman and K. H. Parshall, ‘Victor Kac and Robert Moody: their paths to Kac–Moody Lie algebras’, *Math. Intell.* **24** (2002) 50–60.
- [56] L. Bers, ‘Finite dimensional Teichmüller spaces and generalisations’, *Bull. Amer. Math. Soc.* **5** (1981) 131–72.
- [57] A. Bertram, ‘Quantum Schubert calculus’, *Adv. Math.* **128** (1997) 289–305.
- [58] L. Birke, J. Fuchs and C. Schweigert, ‘Symmetry breaking boundary conditions and WZW orbifolds’, *Adv. Theor. Math. Phys.* **3** (1999) 671–726.
- [59] J. S. Birman, *Braids, Links, and Mapping Class Groups* (Princeton, Princeton University Press, 1974).
- [60] J. S. Birman, ‘Mapping class groups of surfaces’, *Braids (Santa Cruz, 1986)*, Contemp. Math. **78** (Providence, American Mathematical Society, 1988) 13–43.
- [61] J. S. Birman, ‘New points of view in knot theory’, *Bull. Amer. Math. Soc.* **28** (1993) 253–87.
- [62] D. Birmingham, M. Blau, M. Rakowski and G. Thompson, ‘Topological field theory’, *Phys. Rep.* **209** (1991) 129–340.
- [63] S. Bloch, ‘Zeta values and differential operators on the circle’, *J. Alg.* **182** (1996) 476–500.
- [64] D. M. Bloom, ‘On the coefficients of the cyclotomic polynomials’, *Amer. Math. Monthly* **75** (1968) 372–7.
- [65] J. Böckenhauer and D. E. Evans, ‘Modular invariants, graphs and α -induction for nets of subfactors III’, *Commun. Math. Phys.* **205** (1999) 183–228.
- [66] J. Böckenhauer and D. E. Evans, ‘Subfactors and modular invariants’, *Mathematical Physics in Mathematics and Physics (Sienna, 2000)* (Providence, American Mathematical Society, 2001) 11–37.
- [67] N. N. Bogoliubov, A. A. Logunov and I. T. Todorov, *Introduction to Axiomatic Quantum Field Theory* (Reading, W. A. Benjamin Inc., 1975).
- [68] R. E. Borcherds, ‘Vertex algebras, Kac–Moody algebras, and the Monster’, *Proc. Natl. Acad. Sci. (USA)* **83** (1986) 3068–71.
- [69] R. E. Borcherds, ‘Generalized Kac–Moody algebras’, *J. Algebra* **115** (1988) 501–12.
- [70] R. E. Borcherds, ‘The monster Lie algebra’, *Adv. Math.* **83** (1990) 30–47.
- [71] R. E. Borcherds, ‘Central extensions of generalized Kac–Moody algebras’, *J. Algebra* **140** (1991) 330–35.
- [72] R. E. Borcherds, ‘Monstrous moonshine and monstrous Lie superalgebras’, *Invent. Math.* **109** (1992) 405–44.
- [73] R. E. Borcherds, ‘Sporadic groups and string theory’, *First European Congress of Math. (Paris, 1992)*, Vol. I (Basel, Birkhäuser, 1994) 411–21.
- [74] R. E. Borcherds, ‘Automorphic forms on $O_{s+2,2}(\mathbb{R})^+$ and generalized Kac–Moody algebras’, *Proceedings of the International Congress of Mathematicians (Zürich, 1994)* (Basel, Birkhäuser, 1995) 744–52.
- [75] R. E. Borcherds, ‘What is moonshine?’, *Proceedings of the International Congress of Mathematicians (Berlin, 1998)* (Bielefeld, Documenta Mathematica, 1998) 607–15.
- [76] R. E. Borcherds, ‘Automorphic forms with singularities on Grassmannians’, *Invent. Math.* **132** (1998) 491–562.
- [77] R. E. Borcherds, ‘Modular moonshine III’, *Duke Math. J.* **93** (1998) 129–54.
- [78] R. E. Borcherds, ‘Problems in Moonshine’, *First International Congress of Chinese Mathematics (Beijing, 1998)* (Providence, American Mathematical Society, 2001) 3–10.
- [79] R. E. Borcherds and A. J. E. Ryba, ‘Modular moonshine II’, *Duke Math. J.* **83** (1996) 435–59.
- [80] A. Borel *et al.*, *Algebraic D-Modules* (Orlando, Academic Press, 1987).
- [81] L. A. Borisov and A. Libgober, ‘Elliptic genera of toric varieties and applications to mirror symmetry’, *Invent. Math.* **140** (2000) 453–85.
- [82] J. M. Borwein, P. B. Borwein and D. H. Bailey, ‘Ramanujan, modular equations, and approximations to pi or How to compute one billion digits of pi’, *Amer. Math. Monthly* **96** (1989) 201–19.
- [83] R. Bott, ‘On induced representations’, *The Mathematical Heritage of Hermann Weyl*, Proc. Symp. Pure Math. **48** (Providence, American Mathematical Society, 1988) 1–13.
- [84] N. Bourbaki, *Lie Groups and Algebras*, chapters 4–6 (Berlin, Springer, 2002).
- [85] M. J. Bowick and S. G. Rajeev, ‘The holomorphic geometry of closed bosonic string theory and $\text{Diff } S^1/S^1$ ’, *Nucl. Phys.* **293** (1987) 348–84.

- [86] E. Brieskorn, ‘Singular elements of semi-simple algebraic groups’, *Actes Congrès International des Mathématiciens, Vol. 2 (Nice, 1970)* (Paris, Gauthier-Villars, 1971) 279–84.
- [87] D. Brungs and W. Nahm, ‘The associative algebras of conformal field theory’, *Lett. Math. Phys.* **47** (1999) 379–83.
- [88] A. S. Buch, A. Kresch and H. Tamvakis, ‘Gromov–Witten invariants on Grassmannians’, *J. Amer. Math. Soc.* **16** (2003) 901–15.
- [89] D. Bump, *Automorphic Forms and Representations* (Cambridge, Cambridge University Press, 1997).
- [90] D. Bump, J. W. Cagwell, D. Gaitsgory, E. de Shalit, E. Kowalski and S. S. Kudla, *An Introduction to the Langlands Program* (Boston, Birkhäuser, 2003).
- [91] A. Cappelli, C. Itzykson and J.-B. Zuber, ‘The A-D-E classification of $A_1^{(1)}$ and minimal conformal field theories’, *Commun. Math. Phys.* **113** (1987) 1–26.
- [92] R. Carter, G. Segal and I. M. Macdonald, *Lectures on Lie Groups and Lie Algebras* (Cambridge, Cambridge University Press, 1995).
- [93] P. Cartier, ‘A mad day’s work: from Grothendieck to Connes and Kontsevich. The evolution of concepts of space and symmetry’, *Bull. Amer. Math. Soc.* **38** (2001) 389–408.
- [94] A. Cayley, *An Elementary Treatise on Elliptic Functions*, 2nd edn (New York, Dover, 1961).
- [95] S.-P. Chan, M.-L. Lang and C.-H. Lim, ‘Some modular functions associated to Lie algebra E_8 ’, *Math. Z.* **211** (1992) 223–46.
- [96] G. Chapline, ‘Unification of gravity and elementary particle interactions in 26 dimensions?’, *Phys. Lett.* **B158** (1985) 393–6.
- [97] V. Chari, ‘Integrable representations of affine Lie algebras’, *Invent. Math.* **85** (1986) 317–35.
- [98] V. Chari and A. Pressley, *A Guide to Quantum Groups* (Cambridge, Cambridge University Press, 1994).
- [99] S. Chaudhuri and D. A. Lowe, ‘Monstrous string-string duality’, *Nucl. Phys.* **B469** (1996) 21–36.
- [100] G. Y. Chen, ‘A new characterization of finite simple groups’, *Chinese Sci. Bull.* **40** (1995) 446–50.
- [101] I. Chen and N. Yui, ‘Singular values of Thompson series’, *Groups, Difference Sets, and the Monster (Columbus, 1993)* (Berlin, de Gruyter, 1996) 255–326.
- [102] H. Cohn and J. McKay, ‘Spontaneous generation of modular invariants’, *Math. of Comput.* **65** (1996) 1295–309.
- [103] D. J. Collins, R. I. Grigorchuk, P. F. Kurchanov and H. Zieschang, *Combinatorial Group Theory and Applications to Geometry* (Berlin, Springer, 1998).
- [104] L. Conlon, *Differentiable Manifolds*, 2nd edn (Boston, Birkhäuser, 2001).
- [105] A. Connes and D. Kreimer, ‘From local perturbation theory to Hopf- and Lie-algebras of Feynman graphs’, *Mathematical Physics in Mathematics and Physics (Siena, 2000)* (Providence, American Mathematical Society, 2001) 105–14.
- [106] A. Connes and M. Marcolli, ‘Renormalization and motivic Galois theory’, *Int. Math. Res. Not.* **2004**, no. 76, 4073–91.
- [107] J. H. Conway, ‘Monsters and Moonshine’, *Math. Intelligencer* **2** (1980) 165–71.
- [108] J. H. Conway, *The Sensual (Quadratic) Form* (Washington, Mathematical Association of America, 1997).
- [109] J. H. Conway, R. T. Curtis, S. P. Norton, R. A. Parker and R. A. Wilson, *An Atlas of Finite Groups* (Oxford, Oxford University Press, 1985).
- [110] J. H. Conway, J. McKay and A. Sebbar, ‘On the discrete groups of moonshine’, *Proc. Amer. Math. Soc.* **132** (2004) 2233–40.
- [111] J. H. Conway and S. P. Norton, ‘Monstrous moonshine’, *Bull. London Math. Soc.* **11** (1979) 308–39.
- [112] J. H. Conway, S. P. Norton and L. H. Soicher, ‘The Bimonster, the group Y_{555} , and the projective plane of order 3’, *Computers in Algebra* (New York, Dekker, 1988) 27–50.
- [113] J. H. Conway and N. J. A. Sloane, *Sphere Packings, Lattices and Groups*, 3rd edn (Berlin, Springer, 1999).
- [114] A. Coste and T. Gannon, ‘Remarks on Galois in rational conformal field theories’, *Phys. Lett.* **B323** (1994) 316–21.
- [115] A. Coste, T. Gannon and P. Ruelle, ‘Finite group modular data’, *Nucl. Phys.* **B581** (2000) 679–717.
- [116] S. C. Coutinho, *A Primer of Algebraic D-Modules* (Cambridge, Cambridge University Press, 1995).
- [117] D. Cox, *Primes of the Form $x^2 + ny^2$* (New York, Wiley, 1989).
- [118] L. Crane and D. N. Yetter, ‘Deformations of (bi)tensor categories’, *Cah. Top. Géom. Diff. Catég.* **39** (1998) 163–80.

- [119] B. Craps, M. R. Gaberdiel and J. A. Harvey, ‘Monstrous branes’, *Commun. Math. Phys.* **234** (2003) 229–51.
- [120] C. J. Cummins, ‘Modular equations and discrete, genus-zero subgroups of $\mathrm{SL}(2, \mathbb{R})$ containing $\Gamma(N)$ ’, *Canad. Math. Bull.* **45** (2002) 36–45.
- [121] C. J. Cummins, ‘Congruence subgroups of groups commensurable with $PSL(2, \mathbb{Z})$ of genus 0 and 1’, *Experiment. Math.* **13** (2004) 361–82.
- [122] C. J. Cummins and T. Gannon, ‘Modular equations and the genus zero property’, *Invent. Math.* **129** (1997) 413–43.
- [123] C. J. Cummins and S. P. Norton, ‘Rational Hauptmodul are replicable’, *Canad. J. Math.* **47** (1995) 1201–18.
- [124] D. G. Currie, T. F. Jordan and E. C. G. Sudarshan, ‘Relativistic invariance and Hamiltonian theories of interacting particles’, *Rev. Modern Phys.* **35** (1963) 350–75.
- [125] C. W. Curtis and I. Reiner, *Methods of Representation Theory with Applications to Finite Groups and Orders*, Vol. I (New York, Wiley, 1981).
- [126] P. Cvitanović, *Group Theory* (web-book available at <http://www.nbi.dk/GroupTheory>).
- [127] T. Damour, M. Henneaux and H. Nicolai, ‘ E_{10} and a small tension expansion of M theory’, *Phys. Rev. Lett.* **89** (2002) 221–601.
- [128] P. Di Giovanni, ‘Equations de Moore et Seiberg, théories topologiques et théorie de Galois’, *Helv. Phys. Acta* **67** (1994) 799–883.
- [129] P. Deligne and B. H. Gross, ‘La série exceptionnelle des groupes de Lie’, *C. R. Acad. Sci. Paris* **335** (2002) 877–81.
- [130] E. D’Hoker and D. H. Phong, ‘On determinants of Laplacians on Riemann surfaces’, *Commun. Math. Phys.* **104** (1986) 537–45.
- [131] P. Di Francesco, P. Mathieu and D. Sénéchal, *Conformal Field Theory* (New York, Springer, 1996).
- [132] R. Dijkgraaf, ‘Mirror symmetry and elliptic curves’, *The Moduli Space of Curves (Texel Island, 1994)* (Boston, Birkhäuser, 1995) 149–63.
- [133] R. Dijkgraaf, ‘Fields, strings and duality’, *Quantum Symmetries (Les Houches, 1995)* (Amsterdam, Elsevier, 1998) 3–147.
- [134] R. Dijkgraaf, ‘The mathematics of fivebranes’, *Proceedings of the International Congress of Mathematicians (Berlin, 1998)*, Vol. III (Bielefeld, Documenta Mathematica, 1998) 133–42.
- [135] R. Dijkgraaf, V. Pasquier and P. Roche, ‘Quasi-Hopf groups, group cohomology and orbifold models’, *Nucl. Phys. (Proc. Suppl.)* **B18** (1991) 60–72.
- [136] R. Dijkgraaf, C. Vafa, E. Verlinde and H. Verlinde, ‘The operator algebra of orbifold models’, *Commun. Math. Phys.* **123** (1989) 485–526.
- [137] R. Dijkgraaf, E. Verlinde and H. Verlinde, ‘ $c = 1$ conformal field theories on Riemann surfaces’, *Commun. Math. Phys.* **115** (1988) 649–90.
- [138] R. Dijkgraaf and E. Witten, ‘Topological gauge theories and group cohomology’, *Commun. Math. Phys.* **129** (1990) 393–429.
- [139] P. A. M. Dirac, ‘The relation between mathematics and physics’, *Proc. Roy. Soc. Edinburgh* **59** (1939) 122–9.
- [140] P. A. M. Dirac, ‘The large number hypothesis and the Einstein theory of gravitation’, *Proc. Roy. Soc. London A* **A365** (1979) 19–30.
- [141] G. Dito and D. Sternheimer, ‘Deformation quantization: genesis, developments and metamorphoses’, *Deformation Quantization* (Berlin, Walter de Gruyter, 2002) 9–54.
- [142] L. Dixon, P. Ginsparg and J. Harvey, ‘Beauty and the beast: superconformal symmetry in a monster module’, *Commun. Math. Phys.* **119** (1988) 221–41.
- [143] L. Dixon, J. A. Harvey, C. Vafa and E. Witten, ‘Strings on orbifolds’, *Nucl. Phys.* **B261** (1985) 678–86.
- [144] C. Dong, ‘Vertex algebras associated with even lattices’, *J. Alg.* **160** (1993) 245–65.
- [145] C. Dong, ‘Representations of the Moonshine module vertex operator algebra’, *Mathematical Aspects of Conformal and Topological Field Theories and Quantum Groups (Mount Holyoke, 1992)*, *Contemp. Math.* **175** (Providence, American Mathematical Society, 1994) 27–36.
- [146] C. Dong, R. L. Griess, Jr. and C. H. Lam, ‘On the uniqueness of the Moonshine vertex operator algebra’, Preprint (arXiv: math.QA/0506321).
- [147] C. Dong, H. Li and G. Mason, ‘Simple currents and extensions of vertex operator algebras’, *Commun. Math. Phys.* **180** (1996) 671–707.

- [148] C. Dong, H. Li and G. Mason, ‘Vertex operator algebras associated to admissible representations of $\widehat{sl_2}$ ’, *Commun. Math. Phys.* **184** (1997) 65–93.
- [149] C. Dong, H. Li and G. Mason, ‘Vertex operator algebras and associative algebras’, *J. Alg.* **206** (1998) 67–96.
- [150] C. Dong, H. Li and G. Mason, ‘Modular-invariance of trace functions in orbifold theory and generalised moonshine’, *Commun. Math. Phys.* **214** (2000) 1–56.
- [151] C. Dong, K. Liu and X. Ma, ‘Elliptic genus and vertex operator algebras’, *Pure Appl. Math. Q.* **1** (2005) 791–815.
- [152] C. Dong and G. Mason, ‘Nonabelian orbifolds and the boson–fermion correspondence’, *Commun. Math. Phys.* **163** (1994) 523–59.
- [153] C. Dong and G. Mason, ‘An orbifold theory of genus zero associated to the sporadic group M_{24} ’, *Commun. Math. Phys.* **164** (1994) 87–104.
- [154] C. Dong and G. Mason, ‘Vertex operator algebras and moonshine: a survey’, *Progress in Algebraic Combinatorics*, Adv. Stud. Pure Math. **24** (Tokyo, Mathematical Society of Japan, 1996) 101–36.
- [155] C. Dong and G. Mason, ‘Monstrous moonshine of higher weight’, *Acta Math.* **185** (2000) 101–21.
- [156] C. Dong and G. Mason, ‘Rational vertex operator algebras and the effective central charge’, *Int. Math. Res. Not.* **2004** 2989–3008.
- [157] C. Dong and F. Xu, ‘Conformal nets associated with lattices and their orbifolds’, Preprint (arXiv: math.QA/0411499).
- [158] C. F. Doran, ‘Picard–Fuchs uniformization and modularity of the mirror map’, *Commun. Math. Phys.* **212** (2000) 625–47.
- [159] N. Dorey, T. J. Hollowood, V. V. Khoze and M. P. Mattis, ‘The calculus of many instantons’, *Phys. Rep.* **371** (2002) 231–459.
- [160] V. G. Drinfel’d, ‘Quantum groups’, *Proceedings of the International Congress of Mathematicians (Berkeley, 1986)* (Providence, American Mathematical Society, 1987) 798–820.
- [161] V. G. Drinfel’d, ‘On quasitriangular quasi-Hopf algebras on a group that is closely related with $\text{Gal}(\overline{\mathbb{Q}}/\mathbb{Q})$ ’, *Leningrad. Math. J.* **2** (1991) 829–60.
- [162] D. S. Dummit and R. M. Foote, *Abstract Algebra*, 3rd edn (Chichester, Wiley, 2004).
- [163] J. F. Duncan, ‘Super-Moonshine for Conway’s largest sporadic group’, Preprint (arXiv: math.RT/0502267).
- [164] J. L. Dupont and C.-H. Sah, ‘Dilogarithm identities in conformal field theory and group homology’, *Commun. Math. Phys.* **161** (1994) 265–282.
- [165] P. DuVal, ‘On isolated singularities which do not affect the conditions of adjunction’, *Proc. Cambridge Phil. Soc.* **30** (1934) 453–59.
- [166] F. Dyson, ‘Missed opportunities’, *Bull. Amer. Math. Soc.* **78** (1972) 635–52.
- [167] F. J. Dyson, ‘Unfashionable pursuits’, *Math. Intelligencer* **5**, no. 3 (1983) 47–54.
- [168] J. Eells, ‘Automorphisms of the circle – and Teichmüller theory’, *Collection of Papers on Geometry, Analysis and Mathematical Physics* (River Edge, World Scientific, 1997) 44–52.
- [169] W. Eholzer and N.-P. Skoruppa, ‘Conformal characters and theta series’, *Lett. Math. Phys.* **35** (1995) 197–211.
- [170] M. Eichler and D. Zagier, *The Theory of Jacobi Forms* (Boston, Birkhäuser, 1985).
- [171] F. Englert, L. Houart, A. Taormina and P. West, ‘The symmetry of M-theories’, *J. High Energy Phys.* **9** (2003) 020.
- [172] J. G. Esteve, ‘Anomalies in conservation laws in the Hamiltonian formalism’, *Phys. Rev. D* **34** (1986) 674–7.
- [173] S. Eswara Rao and R. V. Moody, ‘Vertex representations for n -toroidal Lie algebras and a generalisation of the Virasoro algebra’, *Commun. Math. Phys.* **159** (1994) 239–64.
- [174] P. Etingof, I. B. Frenkel and A. A. Kirillov, Jr., *Lectures on Representation Theory and Knizhnik–Zamolodchikov Equations* (Providence, American Mathematical Society, 1998).
- [175] P. Etingof and S. Gelaki, ‘Isocategorical groups’, *Intern. Math. Res. Notices* **2001**, no. 2 (2001) 59–76.
- [176] P. Etingof, D. Kazhdan and A. Polishchuk, ‘When is the Fourier transform of an elementary function elementary?’, *Selecta Math. (N.S.)* **8** (2002) 27–66.
- [177] D. E. Evans and Y. Kawahigashi, *Quantum Symmetries on Operator Algebras* (Oxford, Oxford University Press, 1998).
- [178] D. E. Evans and P. R. Pinto, ‘Subfactor realization of modular invariants’, *Commun. Math. Phys.* **237** (2003) 309–63.

- [179] G. Faltings, ‘A proof for the Verlinde formula’, *J. Alg. Geom.* **3** (1994) 347–74.
- [180] H. M. Farkas and I. Kra, *Riemann Surfaces* (New York, Springer, 1980).
- [181] H. D. Fegan, ‘The heat equation on a compact Lie group’, *Trans. Amer. Math. Soc.* **246** (1978) 339–57.
- [182] H. D. Fegan, ‘The heat equation and modular forms’, *J. Diff. Geom.* **13** (1978) 589–602.
- [183] B. L. Feigin and D. B. Fuchs, *Cohomologies of Lie Groups and Lie Algebras*, Encycl. Math. Sci. **21** (Berlin, Springer, 2000) 125–215.
- [184] B. Feigin and F. Malikov, ‘Modular functor and representation theory of $\widehat{sl}(2)$ at a rational level’, *Operads (Hartford/Luminy, 1995)*, Contemp. Math. **202** (Providence, American Mathematical Society, 1997) 357–405.
- [185] A. J. Feingold, I. B. Frenkel and J. F. X. Ries, ‘Spinor construction of vertex operator algebras, triality and $E_8^{(1)}$ ’, *Contemp. Math.* **121** (Providence, American Mathematical Society, 1991).
- [186] G. Felder, ‘The KZB equations on Riemann surfaces’, *Quantum Symmetries (Les Houches, 1995)* (Amsterdam, Elsevier, 1998) 687–725.
- [187] G. Felder, J. Fröhlich and G. Keller, ‘On the existence of unitary conformal field theory I. Existence of conformal blocks’, *Commun. Math. Phys.* **124** (1989) 417–63.
- [188] R. P. Feynman, R. B. Leighton and M. Sands, *The Feynman Lectures on Physics*, Vols I, II, III (Reading, Addison-Wesley, 1964).
- [189] J. M. Figueroa-O’Farrill and S. Stanciu, ‘On the structure of symmetric self-dual Lie algebras’, *J. Math. Phys.* **37** (1996) 4121–34.
- [190] M. Finkelberg, ‘An equivalence of fusion categories’, *Geom. Funct. Anal.* **6** (1996) 249–67.
- [191] K. Fredenhagen, K. H. Rehren and B. Schroer, ‘Superselection sectors with braid group statistics and exchange algebras. I. General theory’, *Commun. Math. Phys.* **125** (1989) 201–26.
- [192] D. S. Freed, ‘On determinant line bundles’, *Mathematical Aspects of String Theory* (Singapore, World Scientific, 1987) 189–238.
- [193] D. S. Freed, M. J. Hopkins and C. Teleman, ‘Twisted equivariant K-theory with complex coefficients’, Preprint (arXiv: math.AT/0206257).
- [194] D. S. Freed and F. Quinn, ‘Chern–Simons theory with finite gauge group’, *Commun. Math. Phys.* **156** (1993) 435–72.
- [195] D. S. Freed and K. K. Uhlenbeck, *Instantons and Four-Manifolds* (New York, Springer, 1984).
- [196] D. S. Freed and C. Vafa, ‘Global anomalies on orbifolds’, *Commun. Math. Phys.* **110** (1987) 349–89.
- [197] E. Frenkel and D. Ben-Zvi, *Vertex Algebras and Algebraic Curves* (Providence, American Mathematical Society, 2001).
- [198] I. B. Frenkel, ‘Orbital theory for affine Lie algebras’, *Invent. Math.* **77** (1984) 301–52.
- [199] I. B. Frenkel, Y.-Z. Huang and J. Lepowsky, *On Axiomatic Approaches to Vertex Operator Algebras and Modules*, Mem. Amer. Math. Soc. **494** (Providence, American Mathematical Society, 1993).
- [200] I. Frenkel, J. Lepowsky and A. Meurman, ‘A natural representation of the Fischer–Griess monster with the modular function J as character’, *Proc. Natl. Acad. Sci. USA* **81** (1984) 3256–60.
- [201] I. Frenkel, J. Lepowsky and A. Meurman, *Vertex Operator Algebras and the Monster* (San Diego, Academic Press, 1988).
- [202] I. B. Frenkel and Y. Zhu, ‘Vertex operator algebras associated to representations of affine and Virasoro algebras’, *Duke Math. J.* **66** (1992) 123–68.
- [203] D. Friedan and S. Shenker, ‘The analytic geometry of two-dimensional conformal field theory’, *Nucl. Phys.* **B281** (1987) 509–45.
- [204] J. Fröhlich, ‘Statistics and monodromy in two- and three-dimensional quantum field theory’, *Differential Geometric Methods in Theoretical Physics (Como, 1987)* (Dordrecht, Kluwer Academic Press, 1988) 173–86.
- [205] J. Fröhlich and T. Kerler, *Quantum Groups, Quantum Categories, and Quantum Field Theory*, Lecture Notes in Math. **1542** (Berlin, Springer, 1993).
- [206] J. Fuchs, ‘More on the super WZW theory’, *Nucl. Phys.* **B318** (1989) 631–54.
- [207] J. Fuchs, *Affine Lie Algebras and Quantum Groups* (Cambridge, Cambridge University Press, 1992).
- [208] J. Fuchs, ‘Fusion rules in conformal field theory’, *Fortsch. Phys.* **42** (1994) 1–48.
- [209] J. Fuchs, ‘Lectures on conformal field theory and Kac–Moody algebras’, *Conformal Field Theories and Integrable Models (Budapest, 1996)* (Berlin, Springer, 1997) 1–54.
- [210] J. Fuchs, U. Ray and C. Schweigert, ‘Some automorphisms of generalized Kac–Moody algebras’, *J. Alg.* **191** (1997) 511–40.

- [211] J. Fuchs, I. Runkel and C. Schweigert, ‘Boundaries, defects and Frobenius algebras’, *Fortsch. Phys.* **51** (2003) 850–55.
- [212] J. Fuchs, A. N. Schellekens and C. Schweigert, ‘A matrix S for all simple current extensions’, *Nucl. Phys.* **B473** (1996) 323–66.
- [213] J. Fuchs, A. N. Schellekens and C. Schweigert, ‘From Dynkin diagram symmetries to fixed point structures’, *Commun. Math. Phys.* **180** (1996) 39–97.
- [214] J. Fuchs and C. Schweigert, *Symmetries, Lie Algebras, and Representations* (Cambridge, Cambridge University Press, 1997).
- [215] J. Fuchs and C. Schweigert, ‘Category theory for conformal boundary conditions’, *Vertex Operator Algebras in Mathematics and Physics (Toronto, 2000)* (Providence, American Mathematical Society, 2003) 25–70.
- [216] J. Fuchs and C. Schweigert, ‘The world-sheet revisited’, *Vertex Operator Algebras in Mathematics and Physics (Toronto, 2000)* (Providence, American Mathematical Society, 2003) 241–9.
- [217] W. Fulton, *Young Tableaux* (Cambridge, Cambridge University Press, 1997).
- [218] W. Fulton, ‘Eigenvalues, invariant factors, highest weights, and Schubert calculus’, *Bull. Amer. Math. Soc.* **37** (2000) 209–49.
- [219] W. Fulton and J. Harris, *Representation Theory: A First Course* (New York, Springer, 1996).
- [220] L. Funar, ‘On the TQFT representations of the mapping class groups’, *Pacif. J. Math.* **188** (1999) 251–74.
- [221] P. Furlan, A. Ganchev and V. B. Petkova, ‘An extension of the character ring of $\text{sl}(3)$ and its quantisation’, *Commun. Math. Phys.* **202** (1999) 701–33.
- [222] M. R. Gaberdiel, ‘Fusion rules of chiral algebras’, *Nucl. Phys.* **B417** (1994) 130–50.
- [223] M. R. Gaberdiel, ‘A general transformation formula for conformal fields’, *Phys. Lett.* **B325** (1994) 366–70.
- [224] M. R. Gaberdiel, ‘Introduction to conformal field theory’, *Rep. Prog. Phys.* **63** (2000) 607–67.
- [225] M. R. Gaberdiel, ‘Fusion rules and logarithmic representations of a WZW model at fractional level’, *Nucl. Phys.* **B618** (2001) 407–36.
- [226] M. R. Gaberdiel and T. Gannon, ‘Boundary states for WZW models’, *Nucl. Phys.* **B639** (2002) 471–501.
- [227] M. R. Gaberdiel and P. Goddard, ‘Axiomatic conformal field theory’, *Commun. Math. Phys.* **209** (2000) 549–94.
- [228] M. R. Gaberdiel and H. G. Kausch, ‘A rational logarithmic conformal field theory’, *Phys. Lett.* **B386** (1996) 131–7.
- [229] M. R. Gaberdiel and A. Neitzke, ‘Rationality, quasirationality and finite W -algebras’, *Commun. Math. Phys.* **238** (2003) 305–31.
- [230] D. Gaitsgory, ‘Notes on two dimensional conformal field theory and string theory’, *Quantum Fields and Strings: A Course for Mathematicians*, Vol. 2 (Providence, American Mathematical Society, 1999) 1017–89.
- [230a] W. Gajda, ‘On $K_*(\mathbb{Z})$ and classical conjectures in the arithmetic of cyclotomic fields,’ *Homotopy Theory* (Northwestern, 2002) (Providence, American Mathematical Society, 2004).
- [231] R. Gangolli, ‘Asymptotic behaviour of spectra of compact quotients of certain symmetric spaces’, *Acta Math.* **121** (1968) 151–92.
- [232] T. Gannon, ‘The classification of $\text{SU}(3)$ modular invariants revisited’, *Ann. Inst. H. Poincaré Phys. Théor.* **65** (1996) 15–55.
- [233] T. Gannon, ‘Monstrous moonshine and the classification of conformal field theories’, *Conformal Field Theory* (Cambridge, MA, Perseus Publishing, 2000) 66 pages.
- [234] T. Gannon, ‘The Cappelli–Itzykson–Zuber A-D-E classification’, *Rev. Math. Phys.* **12** (2000) 739–48.
- [235] T. Gannon, ‘Boundary conformal field theory and fusion ring representations’, *Nucl. Phys.* **B627** (2002) 506–64.
- [236] T. Gannon, ‘Modular data: the algebraic combinatorics of conformal field theory’, *J. Alg. Combin.* **22** (2005) 211–50.
- [237] T. Gannon, ‘Monstrous Moonshine: the first twenty-five years’, *Bull. London Math. Soc.* **38** (2006) 1–33.
- [238] T. Gannon and C. S. Lam, ‘Gluing and shifting lattice constructions and rational equivalence’, *Rev. Math. Phys.* **3** (1991) 331–69.

- [239] K. Gawedzki, ‘Conformal field theory’, Séminaire Bourbaki, *Astérisque* **177–178** (1989) 95–126.
- [240] K. Gawedzki, ‘SU(2) WZW theory at higher genera’, *Commun. Math. Phys.* **169** (1995) 329–71.
- [241] K. Gawedzki, ‘Lectures on conformal field theory’, *Quantum Fields and Strings: A Course for Mathematicians*, Vol. 2 (Providence, American Mathematical Society, 1999) 727–805.
- [242] R. W. Gebert, ‘Introduction to vertex algebras, Borcherds algebras, and the monster Lie algebra’, *Intern. J. Mod. Phys. A* **8** (1993) 5441–503.
- [243] I. M. Gel’fand, M. I. Graev and I. I. Piatetski-Shapiro, *Representation Theory and Automorphic Functions* (Boston, Academic Press, 1990).
- [244] I. M. Gel’fand and N. Ya. Vilenkin, *Generalized Functions*, Vol. 4 (New York, Academic Press, 1964).
- [245] D. Gepner and E. Witten, ‘Strings on group manifolds’, *Nucl. Phys.* **B278** (1986) 493–549.
- [246] P. Ginsparg, ‘Applied conformal field theory’, *Champs, cordes et phénomènes critiques (Les Houches, 1988)* (Amsterdam, North-Holland, 1990) 1–168.
- [247] G. Glauberman and S. P. Norton, ‘On McKay’s connection between the affine E_8 diagram and the Monster’, *Proceedings on Moonshine and Related Topics (Montréal, 1999)* (Providence, American Mathematical Society, 2001) 37–42.
- [248] P. Goddard, ‘Meromorphic conformal field theory’, *Infinite Dimensional Lie Algebras and Groups (Luminy–Marseille, 1988)* (Teaneck, World Scientific, 1989) 556–87.
- [249] P. Goddard, ‘The work of Richard Ewen Borcherds’, *Proceedings of the International Congress of Mathematicians (Berlin, 1998)*, Vol. I (Bielefeld, Documenta Mathematica, 1998) 99–108.
- [250] P. Goddard, A. Kent and D. Olive, ‘Unitary representations of Virasoro and super-Virasoro algebras’, *Commun. Math. Phys.* **103** (1986) 105–19.
- [251] P. Goddard and D. I. Olive, ‘Kac–Moody and Virasoro algebras in relation to quantum physics’, *Int. Journ. Mod. Phys. A* **1** (1986) 303–414.
- [252] D. M. Goldschmidt and V. F. R. Jones, ‘Metaplectic link invariants’, *Geom. Ded.* **31** (1989) 165–91.
- [253] C. Gómez, M. Ruiz-Altaba and G. Sierra, *Quantum Groups in Two-dimensional Physics* (Cambridge, Cambridge University Press, 1996).
- [254] G. Gonzalez-Springberg and J. L. Verdier, ‘Construction géométrique de la correspondance de McKay’, *Ann. Scient. Ec. Norm. Sup.* **16** (1983) 409–49.
- [255] F. M. Goodman and H. Wenzl, ‘Littlewood–Richardson coefficients for Hecke algebras at roots of unity’, *Adv. Math.* **82** (1990) 244–65.
- [256] D. Gorenstein, *Finite Simple Groups: An Introduction to their Classification* (New York, Plenum, 1982).
- [257] F. Q. Gouvêa, *p-adic Numbers: An Introduction*, 2nd edn (Berlin, Springer, 1997).
- [258] I. S. Gradshteyn, I. M. Ryzhik and A. Jeffrey, *Table of Integrals, Series and Products*, 5th edn (London, Academic Press, 1994).
- [259] J. J. Gray, *Linear Differential Equations and Group Theory from Riemann to Poincaré*, 2nd edn (Boston, Birkhäuser, 1999).
- [260] M. B. Green and D. Kutasov, ‘Monstrous heterotic quantum mechanics’, *J. High Energy Phys.* **9801** (1998) 012.
- [261] M. B. Green, J. H. Schwarz, and E. Witten, *Superstring Theory*, Vols 1, 2, 2nd edn (Cambridge, Cambridge University Press, 1988).
- [262] B. Greene, *The Elegant Universe* (New York, W. W. Norton, 1999).
- [263] R. L. Griess, Jr., ‘The friendly giant’, *Invent. Math.* **69** (1982) 1–102.
- [264] V. A. Gritsenko and V. V. Nikulin, ‘Automorphic forms and Loentzian Kac–Moody algebras, Part I’, *Int. J. Math.* **9** (1998) 153–99.
- [265] V. A. Gritsenko and V. V. Nikulin, ‘Automorphic forms and Loentzian Kac–Moody algebras, Part II’, *Int. J. Math.* **9** (1998) 201–75.
- [266] V. A. Gritsenko and V. V. Nikulin, ‘The arithmetic mirror symmetry and Calabi–Yau manifolds’, *Commun. Math. Phys.* **210** (2000) 1–11.
- [267] A. Grothendieck, ‘Esquisse d’un programme’, *Geometric Galois Actions*, Vol. 1 (Cambridge, Cambridge University Press, 1997) 5–48.
- [268] S. Gukov and C. Vafa, ‘Rational conformal field theories and complex multiplication’, *Commun. Math. Phys.* **246** (2004) 181–210.
- [269] R. Haag, *Local Quantum Physics*, 2nd edn (Berlin, Springer, 1996).

- [270] R. Hain, ‘Moduli of Riemann surfaces, transcendental aspects’, *School on Algebraic Geometry (Trieste, 1999)* (Trieste, Abdus Salam Intern. Center Theor. Phys., 2000) 293–353.
- [271] A. Hanany and Y.-H. He, ‘Non-abelian finite gauge theories’, *J. High Energy Phys.* 1999, no. 2, Paper 13, 31 pp.
- [272] K. Harada, M. Miyamoto and H. Yamada, ‘A generalization of Kac–Moody algebras’, *Groups, Difference Sets, and the Monster (Columbus, 1993)* (Berlin, de Gruyter, 1996) 377–408.
- [273] J. Harris, ‘An introduction to the moduli space of curves’, *Mathematical Aspects of String Theory* (Singapore, World Scientific, 1987) 285–312.
- [274] J. A. Harvey, ‘Twisting the heterotic string’, *Workshop on Unified String Theories (Santa Barbara, 1985)* (Singapore, World Scientific, 1986) 704–20.
- [275] J. A. Harvey and G. Moore, ‘Algebras, BPS states, and strings’, *Nucl. Phys.* **B463** (1996) 315–68.
- [276] J. A. Harvey and G. Moore, ‘On the algebras of BPS states’, *Commun. Math. Phys.* **197** (1998) 489–519.
- [277] A. Hatcher, *Algebraic Topology* (Cambridge, Cambridge University Press, 2002).
- [278] A. Hatcher and W. Thurston, ‘A presentation for the mapping class group of a closed orientable surface’, *Topol.* **19** (1980) 221–37.
- [279] M. Hazewinkel, ‘The philosophy of deformations: introductory remarks and a guide to this volume’, *Deformation Theory of Algebras and Structures and Applications (Il Ciocco, 1986)* (Dordrecht, Kluwer, 1988) 1–7.
- [280] M. Hazewinkel, W. Hesselink, D. Siersma and F. D. Veldkamp, ‘The ubiquity of Coxeter–Dynkin diagrams (an introduction to the A-D-E problem)’, *Nieuw Arch. Wisk.* **25** (1977) 257–307.
- [281] Y.-H. He and V. Jejjala, ‘Modular matrix models’, Preprint (arXiv: hep-th/0307293).
- [282] E. Hecke, *Lectures on the Theory of Algebraic Numbers* (New York, Springer, 1981).
- [283] G. Hemion, *The Classification of Knots and Three-dimensional Spaces* (New York, Oxford University Press, 1992).
- [284] D. W. Henderson and D. Taimina, ‘Crocheting the hyperbolic plane’, *Math. Intell.* **23** (2001) 17–27.
- [285] P. Henry-Labordere, B. Julia and L. Paulot, ‘Real Borcherds superalgebras and M-theory’, *J. High Energy Phys.* **0304** (2003) 060.
- [286] M.-R. Herman, ‘Simplicité du groupe des difféomorphismes de classe C^∞ , isotopes à l’identité, du tore de dimension n ’, *C. R. Acad. Paris A273* (1971) 232–4.
- [287] F. Hirzebruch, T. Berger and R. Jung, *Manifolds and Modular Forms*, 2nd edn (Aspects of Math, Braunschweig, Vieweg, 1994).
- [288] N. Hitchin, ‘Flat connections and geometric quantization’, *Commun. Math. Phys.* **131** (1990) 347–80.
- [289] G. Höhn, ‘The group of symmetries of the shorter Moonshine module’, Preprint (arXiv: math.QA/0210076).
- [290] G. Höhn, ‘Generalized moonshine for the Baby Monster’, Preprint (2003).
- [291] K. Hori, S. Katz, A. Klemm, R. Pandharipande, R. Thomas, C. Vafa, R. Vakil and E. Zaslow, *Mirror Symmetry* (Providence, American Mathematical Society, 2003).
- [292] T. Hsu, *Quilts: Central Extensions, Braid Actions, and Finite Groups*, Lecture Notes in Math. **1731** (Berlin, Springer, 2000).
- [293] Y.-Z. Huang, ‘Applications of the geometric interpretation of vertex operator algebras’, *Proceedings of the 20th International Conference on Differential Geometric Methods in Theoretical Physics (New York, 1991)* (Singapore, World Scientific, 1992) 333–43.
- [294] Y.-Z. Huang, ‘Binary trees and finite-dimensional Lie algebras’, *Algebraic Groups and their Generalizations: Quantum and Infinite-Dimensional Methods*, Proc. Symp. Pure Math. **56**, pt. 2 (Providence, American Mathematical Society, 1994) 337–48.
- [295] Y.-Z. Huang, *Two-Dimensional Conformal Geometry and Vertex Operator Algebras* (Boston, Birkhäuser, 1997).
- [296] Y.-Z. Huang, ‘Riemann surfaces with boundaries and the theory of vertex operator algebras’, Preprint (arXiv: math.QA/0212308).
- [297] Y.-Z. Huang, ‘Vertex operator algebras, the Verlinde conjecture and modular tensor categories’, *Proc. Natl. Acad. Sci. USA* **102** (2005) 5352–6.
- [298] Y.-Z. Huang and J. Lepowsky, ‘Tensor products of modules for a vertex operator algebra and tensor categories’, *Lie Theory and Geometry in Honor of Bertram Kostant* (Boston, Birkhäuser, 1994) 349–83.

- [299] T. Hübsch, *Calabi–Yau Manifolds* (River Edge, World Scientific, 1992).
- [300] J. E. Humphreys, *Introduction to Lie Algebras and Representation Theory* (New York, Springer, 1994).
- [301] J. E. Humphreys, *Reflection Groups and Coxeter Groups* (Cambridge, Cambridge University Press, 1990).
- [302] J. E. Humphreys, ‘Modular representations of simple Lie algebras’, *Bull. Amer. Math. Soc.* **53** (1998) 105–22.
- [303] T. I. Ibukiyama, ‘Modular forms of rationalweights and modular varieties’, *Abh. Math. Sem. Univ. Hamburg* **70** (2000) 315–39.
- [304] Y. Ihara, ‘Profinite braid groups, Galois representations and complex multiplication’, *Ann. Math.* **123** (1986) 43–106.
- [305] Y. Ihara, ‘Braids, Galois groups, and some arithmetic functions’, *Proceedings of the International Congress of Mathematicians (Kyoto, 1990)* (Tokyo, Japan Mathematical Society, 1991) 120–99.
- [306] T. Inami, H. Kanno, T. Ueno and C.-S. Xiong, ‘Two-toroidal Lie algebra as current algebra of the four-dimensional Kähler WZW model’, *Phys. Lett.* **B399** (1997) 97–104.
- [307] E. L. Ince, *Ordinary Differential Equations* (New York, Dover, 1956).
- [308] I. M. Isaacs, *Character Theory of Finite Groups* (New York, Academic Press, 1976).
- [309] D. Israël, A. Pakman and J. Troost, ‘Extended $SL(2, \mathbb{R})/U(1)$ characters, or modular properties of a simple non-rational conformal field theory’, *J. High Energy Phys.* **0404** (2004) 045.
- [310] C. Itzykson and J.-B. Zuber, *Quantum Field Theory* (New York, McGraw–Hill, 1990).
- [311] A. A. Ivanov, ‘Geometric presentations of groups with an application to the Monster’, *Proceedings of the International Congress of Mathematicians (Kyoto, 1990)*, Vol. II (Hong Kong, Springer, 1991) 1443–53.
- [312] A. A. Ivanov, ‘ Y -groups via transitive extension’, *J. Alg.* **218** (1999) 412–35.
- [313] R. Ivanov and M. P. Tuite, ‘Some irrational generalized Moonshine from orbifolds’, *Nucl. Phys. B* **635** (2002) 473–91.
- [314] N. Jacobson, *Lie Algebras* (New York, Dover, 1979).
- [315] K. W. Johnson, ‘The Dedekind–Frobenius group determinant: new life in an old problem’, *Groups St. Andrews (Bath, 1997)*, Vol. II (Cambridge, Cambridge University Press, 1999) 417–28.
- [316] V. F. R. Jones, ‘Hecke algebra representations of braid groups and link polynomials’, *Ann. Math.* **126** (1987) 335–88.
- [317] V. F. R. Jones, *Subfactors and Knots* (Providence, American Mathematical Society, 1991).
- [318] V. F. R. Jones, ‘Three lectures on knots and von Neumann algebras’, *Infinite-dimensional Geometry, Non-Commutative Geometry, Operator Algebras, and Fundamental Interactions* (Singapore, World Scientific, 1995) 96–113.
- [319] V. Jones and V. S. Sunder, *Introduction to Subfactors* (Cambridge, Cambridge University Press, 1997).
- [320] J. Jorgenson and S. Lang, ‘The ubiquitous heat kernel’, *Mathematics Unlimited – 2001 and Beyond* (Berlin, Springer, 2001) 655–83.
- [321] A. Joyal and R. Street, ‘Braided tensor categories’, *Adv. Math.* **102** (1993) 20–78.
- [322] E. Jurisich, ‘An exposition of generalized Kac–Moody algebras’, *Lie Algebras and their Representations (Seoul, 1995)*, *Contemp. Math.* **194** (Providence, American Mathematical Society, 1996) 121–59.
- [323] E. Jurisich, ‘Generalized Kac–Moody Lie algebras, free Lie algebras and the structure of the Monster Lie algebra’, *J. Pure Appl. Alg.* **126** (1998) 233–66.
- [324] E. Jurisich, J. Lepowsky and R. L. Wilson, ‘Realizations of the Monster Lie algebra’, *Selecta Math. (NS)* **1** (1995) 129–61.
- [325] V. G. Kac, ‘Simple irreducible graded Lie algebras of finite growth’, *Math USSR-Izv.* **2** (1968) 1271–311.
- [326] V. G. Kac, ‘An elucidation of: infinite-dimensional algebras, Dedekind’s η -function, classical Möbius function and the very strange formula. $E_8^{(1)}$ and the cube root of the modular invariant j ’, *Adv. Math.* **35** (1980) 264–73.
- [327] V. G. Kac, ‘Simple Lie groups and the Legendre symbol’, *Algebra*, Lecture Notes in Math. **848** (New York, Springer, 1981) 110–23.
- [328] V. G. Kac, *Infinite Dimensional Lie Algebras*, 3rd edn (Cambridge, Cambridge University Press, 1990).

- [329] V. G. Kac, ‘The idea of locality’, *Physical Applications and Mathematical Aspects of Geometry, Groups and Algebras* (Singapore, World Scientific, 1997) 16–32.
- [330] V. G. Kac, *Vertex Algebras for Beginners*, 2nd edn (Providence, American Mathematical Society, 1998).
- [331] V. G. Kac and S.-J. Kang, ‘Trace formula for graded Lie algebras and Monstrous Moonshine’, *Representations of Groups (Banff, 1994)* (Providence, American Mathematical Society, 1995) 141–54.
- [332] V. G. Kac, R. Longo and F. Xu, ‘Solitons in affine and permutation orbifolds’, *Commun. Math. Phys.* **253** (2005) 732–64.
- [333] V. G. Kac and D. H. Peterson, ‘Infinite dimensional Lie algebras, theta functions, and modular forms’, *Adv. Math.* **53** (1984) 125–264.
- [334] V. G. Kac and A. K. Raina, *Highest Weight Representations of Infinite Dimensional Lie Algebras* (Singapore, World Scientific, 1987).
- [335] V. G. Kac and M. Wakimoto, ‘Classification of modular invariant representations of affine algebras’, *Infinite-dimensional Lie Algebras and Groups (Luminy–Marseille, 1988)* (Teaneck, World Scientific, 1989) 138–77.
- [336] V. G. Kac and M. Wakimoto, ‘Integrable highest weight modules over affine superalgebras and number theory’, *Lie Theory and Geometry in Honor of Bertram Kostant*, Progress in Math. **123** (Boston, Birkhäuser, 1994) 415–56.
- [337] S. Kass, R. V. Moody, J. Patera and R. Slansky, *Affine Lie Algebras, Weight Multiplicities, and Branching Rules*, Vol. I (Berkeley, University of California Press, 1990).
- [338] C. Kassel, *Quantum Groups* (New York, Springer, 1995).
- [339] C. Kassel and V. Turaev, ‘Chord diagram invariants of tangles and graphs’, *Duke Math. J.* **92** (1998) 497–552.
- [340] Y. Kawahigashi and R. Longo, ‘Classification of local conformal nets. Case $c < 1$ ’, *Ann. Math.* **160** (2004) 493–522.
- [341] Y. Kawahigashi, R. Longo and M. Müger, ‘Multi-internal subfactors and modularity of representations in conformal field theory’, *Commun. Math. Phys.* **219** (2001) 631–69.
- [342] T. Kawai, ‘String duality and modular forms’, *Phys. Lett.* **B397** (1997) 51–62.
- [343] S. V. Ketov, *Quantum Non-Linear Sigma-Models* (Berlin, Springer, 2000).
- [344] B. Khesin, ‘A hierarchy of centrally extended algebras and the logarithm of the derivative operator’, *Intern. Math. Res. Notices* **1992** 1–5.
- [345] A. Khurana, ‘Bosons condense and fermions exclude, but anyons...?’, *Phys. Today* **Nov.** (1989) 17–21.
- [346] A. A. Kirillov, *Lectures on the Orbit Method* (Providence, American Mathematical Society, 2004).
- [347] A. N. Kirillov, ‘Dilogarithm identities’, *Quantum Field Theory, Integrable Models and Beyond (Kyoto, 1994)* (Progress of Theoretical Physics Supplement, Kyoto, 1995) 61–142.
- [348] A. W. Knapp, *Lie Groups: Beyond an Introduction* (Boston, Birkhäuser, 1996).
- [349] A. W. Knapp and P. E. Trapa, ‘Representations of semisimple Lie groups’, *Representation Theory of Lie Groups (Park City, 1998)* (Providence, American Mathematical Society, 2000) 7–87.
- [350] M. Knopp and G. Mason, ‘Generalized modular forms’, *J. Number Theory* **99** (2003) 1–28.
- [351] N. Koblitz and D. Rohrlich, ‘Simple factors in the Jacobian of a Fermat curve’, *Canad. J. Math.* **30** (1978) 1183–205.
- [352] N. Koblitz, *Introduction to Elliptic Curves and Modular Forms*, 2nd edn (New York, Springer, 1993).
- [353] J. Kock, *Frobenius Algebras and 2D Topological Quantum Field Theories* (Cambridge, Cambridge University Press, 2003).
- [354] V. Kodiyalam and V. S. Sunder, *Topological Quantum Field Theories from Subfactors* (New York, Chapman & Hall, 2001).
- [355] T. Kohno, *Conformal Field Theory and Topology* (Providence, American Mathematical Society, 2002).
- [356] M. Koike, ‘Moonshine for $\mathrm{PSL}_2(\mathbb{F}_7)$ ’, *Automorphic Forms and Number Theory*, Adv. Stud. Pure Math. **7** (Providence, American Mathematical Society, 1995) 103–11.
- [357] M. L. Kontsevich, ‘Virasoro algebra and Teichmüller spaces’, *Funct. Anal. Appl.* **21** (1987) 156–7.
- [358] M. Kontsevich, ‘Product formulas for modular forms on $O(2, n)$ [after R. Borcherds]’, *Séminaire Bourbaki 1996/97, no. 821, Astérisque* **245** (1997) 41–56.

- [359] M. Kontsevich and Yu. Manin, ‘Gromov–Witten classes, quantum cohomology, and enumerative geometry’, *Mirror Symmetry II* (Providence, American Mathematical Society, 1997) 607–53.
- [360] D. N. Kozlov, ‘On completely replicable functions and extremal poset theory’, MSc thesis, University of Lund, Sweden, 1994.
- [361] D. Kreimer, *Knots and Feynman Diagrams* (Cambridge, Cambridge University Press, 2000).
- [362] P. B. Kronheimer and H. Nakajima, ‘Yang–Mills instantons on ALE gravitational instantons’, *Math. Ann.* **288** (1990) 263–307.
- [363] M. Kuga, *Galois’ Dream: Group Theory and Differential Equations* (Boston, Birkhäuser, 1993).
- [364] R. Kultze, ‘Elliptic genera and the moonshine module’, *Math. Z.* **223** (1996) 463–71.
- [365] C. H. Lam, H. Yamada and H. Yamauchi, ‘Vertex operator algebras, extended E_8 diagram, and McKay’s observation on the Monster simple group’, Preprint (arXiv: math.QA/0403010).
- [366] M.-L. Lang, ‘On a question raised by Conway–Norton’, *J. Math. Soc. Japan* **41** (1989) 263–84.
- [367] S. Lang, *Complex Multiplication* (New York, Springer, 1983).
- [368] S. Lang, *Elliptic Functions*, 2nd edn (New York, Springer, 1997).
- [369] H. B. Lawson, Jr. and M. L. Michelsohn, *Spin Geometry* (Princeton, Princeton University Press, 1989).
- [370] F. W. Lawvere and S. H. Schanuel, *Conceptual Mathematics: A First Introduction to Categories* (Cambridge, Cambridge University Press, 1997).
- [371] P. P. Lax and R. S. Phillips, *Scattering Theory for Automorphic Functions* (Princeton, Princeton University Press, 1976).
- [372] F. Lemmermeyer, ‘Conics – a poor man’s elliptic curves’, Preprint (arXiv: math.NT/0311306).
- [373] J. Lepowsky, ‘Euclidean Lie algebras and the modular function j ’, *The Santa Cruz Conference on Finite Groups (Santa Cruz, 1979)*, Proc. Sympos. Pure Math. **37** (Providence, American Mathematical Society, 1980) 567–70.
- [374] J. Lepowsky, ‘Application of the numerator formula to k -rowed plane partitions’, *Adv. Math.* **35** (1980) 179–94.
- [375] J. Lepowsky, ‘Vertex operator algebras and the zeta function’, *Recent Developments in Quantum Affine Algebras and Related Topics (Raleigh, 1999)*, Contemp. Math. **248** (Providence, American Mathematical Society, 1999) 327–40.
- [376] J. Lepowsky and H. Li, *Introduction to Vertex Operator Algebras and their Representations* (Boston, Birkhäuser, 2004).
- [377] J. Lepowsky and R. L. Wilson, ‘Construction of the affine Lie algebra $A_1^{(1)}$ ’, *Commun. Math. Phys.* **62** (1978) 43–53.
- [378] F. Lesage, P. Mathieu, J. Rasmussen and H. Saleur, ‘Logarithmic lift of the $SU(2)_{-1/2}$ model’, *Nucl. Phys.* **B686** (2004) 313–46.
- [379] J. B. Lewis and D. Zagier, ‘Period functions for Maass wave forms I’, *Ann. Math.* **153** (2001) 191–258.
- [380] H. Li, ‘Symmetric invariant bilinear forms on vertex operator algebras’, *J. Pure Appl. Alg.* **96** (1994) 279–97.
- [381] H. Li, ‘Some finiteness properties of regular vertex operator algebras’, *J. Alg.* **212** (1999) 495–514.
- [382] H. Li, ‘Determining fusion rules by $A(V)$ -modules and bimodules’, *J. Alg.* **212** (1999) 515–56.
- [383] S.-P. Li, R. V. Moody, M. Nicolescu and J. Patera, ‘Verma bases for representations of classical simple Lie algebras’, *J. Math. Phys.* **27** (1986) 666–77.
- [384] B. H. Lian, ‘On classification of simple vertex operator algebras’, *Commun. Math. Phys.* **163** (1994) 307–57.
- [385] B. H. Lian and S.-T. Yau, ‘Arithmetic properties of mirror map and quantum coupling’, *Commun. Math. Phys.* **176** (1996) 163–91.
- [386] B. H. Lian and G. J. Zuckerman, ‘Moonshine cohomology’, *Moonshine and Vertex Operator Algebras* (Surikaisekikenkyusho Kokyuroku no. 904, Kyoto, 1995) 87–115.
- [387] G. Lion and M. Vergne, *The Weil Representation, Maslov Index and Theta Series* (Boston, Birkhäuser, 1980).
- [388] K. Liu, ‘On modular invariance and rigidity theorems’, *J. Diff. Geom.* **41** (1995) 343–96.
- [389] K. Liu, ‘Heat kernels, symplectic geometry, moduli spaces and finite groups’, *Surveys in Differential Geometry: Differential Geometry Inspired by String Theory* (Boston, International Press, 1999) 527–42.

- [390] R. Longo and K.-H. Rehren, ‘Nets of subfactors’, *Rev. Math. Phys.* **7** (1995) 567–97.
- [391] G. Lusztig, ‘Leading coefficients of character values of Hecke algebras’, *The Arcata Conference on Representations of Finite Groups (Arcata, 1986)*, Proc. Symp. Pure Math. **47** (Providence, American Mathematical Society, 1987) 235–62.
- [392] G. Lusztig, *Introduction to Quantum Groups* (Boston, Birkhäuser, 1994).
- [393] G. Lusztig, ‘Exotic Fourier transform’, *Duke Math. J.* **73** (1994) 227–41.
- [394] Z.-Q. Ma, *Yang–Baxter Equation and Quantum Enveloping Algebras* (Singapore, World Scientific, 1993).
- [395] H. Maass, *Siegel’s Modular Forms and Dirichlet Series*, Lecture Notes in Math. **216** (Berlin, Springer, 1971).
- [396] I. G. Macdonald, ‘Affine root systems and Dedekind’s η -function’, *Invent. Math.* **15** (1972) 91–143.
- [397] S. MacLane, *Categories for the Working Mathematician*, 2nd edn (New York, Springer, 1998).
- [398] S. Majid, *Foundations of Quantum Group Theory* (Cambridge, Cambridge University Press, 1995).
- [399] M. Mahowald and M. Hopkins, ‘The structure of 24 dimensional manifolds having normal bundles which lift to $BO[8]$ ’, *Recent Progress in Homotopy Theory*, Contemp. Math. **293** (Providence, American Mathematical Society, 2002) 89–110.
- [400] F. Malikov and V. Schechtman, ‘Deformations of vertex algebras, quantum cohomology of toric varieties, and elliptic genus’, *Commun. Math. Phys.* **234** (2003) 77–100.
- [401] F. Malikov, V. Schechtman and A. Vaintrob, ‘Chiral de Rham complex’, *Commun. Math. Phys.* **204** (1999) 439–73.
- [402] Yu. I. Manin, ‘Critical dimensions of the string theories and the dualizing sheaf on the moduli space of (super) curves’, *Funct. Anal. Appl.* **20** (1986) 244–6.
- [403] M. Mariño, ‘Enumerative geometry and knot invariants’, *Infinite Dimensional Groups and Manifolds*, 27–92 (Berlin, de Gruyter, 2004).
- [404] G. Masbaum and J. D. Roberts, ‘On central extensions of mapping class groups’, *Math. Ann.* **302** (1995) 131–50.
- [405] G. Mason, ‘Finite groups and modular functions’, *The Arcata Conference on Representations of Finite Groups (Arcata, 1986)*, Proc. Sympos. Pure Math. **47** (Providence, American Mathematical Society, 1987) 181–209.
- [406] G. Mason, ‘The quantum double of a finite group and its role in conformal field theory’ *Groups ’93 (Galway, 1993)* (Cambridge, Cambridge University Press, 1995) 405–17.
- [407] G. Mason, ‘On a system of elliptic modular forms attached to the large Mathieu group’, *Nagoya Math. J.* **118** (1990) 177–93.
- [408] G. Mason, talk, Erwin-Schrödinger-Institut (Vienna), June 2004.
- [409] O. Mathieu, ‘Classification of simple graded Lie algebras of finite growth’, *Invent. Math.* **108** (1992) 455–519.
- [410] A. Matsuo, ‘On generalizations of Zhu’s algebra and the zero-mode algebra’ (talk, Edinburgh, July 2004).
- [411] J. McKay, ‘Graphs, singularities, and finite groups’, *The Santa Cruz Conference on Finite Groups (Santa Cruz, 1979)*, Proc. Sympos. Pure Math. **37** (Providence, American Mathematical Society, 1980) 183–6.
- [412] J. McKay, ‘The essentials of Monstrous Moonshine’, *Groups and Combinatorics – in Memory of M. Suzuki*, Adv. Studies Pure Math. **32** (Tokyo, Mathematical Society of Japan, 2001) 347–53.
- [413] J. McKay and H. Strauss, ‘The q -series of monstrous moonshine and the decomposition of the head characters’, *Commun. Alg.* **18** (1990) 253–78.
- [414] H. McKean and V. Moll, *Elliptic Curves: Function Theory, Geometry, Arithmetic* (Cambridge, Cambridge University Press, 1999).
- [415] A. Medina and P. Revoy, ‘Algèbres de Lie et produit scalaire invariant’, *Ann. Scient. Éc. Norm. Sup.* **18** (1985) 553–61.
- [416] J.-F. Mestre, R. Schoof, L. Washington and D. Zagier, ‘Quotients Homophones des groupes libres/Homophonic quotients of free groups’, *Experiment. Math.* **2** (1993) 153–5.
- [417] D. Milicic, ‘Algebraic \mathcal{D} -modules and representation theory of semisimple Lie groups’, *Contemp. Math.* **154** (Providence, American Mathematical Society, 1993) 133–68.
- [418] G. A. Miller, ‘Determination of all the groups of order 64’, *Amer. J. Math.* **52** (1930) 617–34.
- [419] J. Milnor, *Introduction to Algebraic K-Theory*, Annals of Math. Studies **72** (Princeton, Princeton University Press, 1971).

- [420] H. Minc, *Nonnegative Matrices* (New York, Wiley, 1988).
- [421] R. Mirman, *Group Theory: An Intuitive Approach* (River Edge, World Scientific, 1995).
- [422] C. W. Misner, K. S. Thorne and J. A. Wheeler, *Gravitation* (San Francisco, W. H. Freeman and Co., 1973).
- [423] T. Miwa, M. Jimbo and E. Date, *Solitons, Differential Equations and Infinite-Dimensional Algebras* (Cambridge, Cambridge University Press, 1999).
- [424] M. Miyamoto, ‘21 involutions acting on the Moonshine module’, *J. Alg.* **175** (1995) 941–65.
- [425] M. Miyamoto, ‘Griess algebras and conformal vectors in vertex operator algebras’, *J. Alg.* **179** (1996) 523–48.
- [426] M. Miyamoto, ‘A modular invariance on the theta functions defined on vertex operator algebras’, *Duke Math. J.* **101** (2000) 221–36.
- [427] M. Miyamoto, ‘A new construction of the Moonshine vertex operator algebras over the real number field’, *Ann. Math.* **159** (2004) 535–96.
- [428] E. J. Mlawer, S. G. Naculich, H. A. Riggs and H. J. Schnitzer, ‘Group-level duality of WZW fusion coefficients and Chern–Simons link observables’, *Nucl. Phys.* **B352** (1991) 863.
- [429] P. S. Montague, ‘On representations of conformal field theories and the construction of orbifolds’, *Lett. Math. Phys.* **38** (1996) 1–11.
- [430] R. V. Moody, ‘Lie algebras associated with generalized Cartan matrices’, *Bull. Amer. Math. Soc.* **73** (1967) 217–21.
- [431] R. V. Moody and J. Patera, ‘Computation of character decompositions of class functions on compact semi-simple Lie groups’, *Math. Comput.* **48** (1987) 799–827.
- [432] R. V. Moody and A. Pianzola, *Lie Algebras with Triangular Decompositions* (New York, John Wiley & Sons, 1995).
- [433] G. Moore, ‘Atkin–Lehner symmetry’, *Nucl. Phys.* **B293** (1987) 139–88.
- [434] G. W. Moore, ‘String duality, automorphic forms, and generalized Kac-Moody algebras’, *Nucl. Phys. B: Proc. Suppl.* **67** (1998) 56–67.
- [435] G. Moore, ‘Les Houches lectures on strings and arithmetic’, Preprint (arXiv: hep-th/0401049).
- [436] G. Moore and N. Seiberg, ‘Classical and quantum conformal field theory’, *Commun. Math. Phys.* **123** (1989) 177–254.
- [437] G. Moore and N. Seiberg, ‘Lectures on RCFT’, *Physics, Geometry and Topology* (New York, Plenum Press, 1990) 263–361.
- [438] D. R. Morrison, ‘Picard–Fuchs equations and mirror maps for hypersurfaces’, *Essays on Mirror Manifolds* (Hong Kong, International Press, 1992) 241–64.
- [439] D. Mumford, *Tata Lectures on Theta I* (Boston, Birkhäuser, 1983).
- [440] D. Mumford, M. Nori and P. Norman, *Tata Lectures on Theta III* (Boston, Birkhäuser, 1991).
- [441] W. Nahm, ‘Lie group exponents and SU(2) current algebras’, *Commun. Math. Phys.* **118** (1988) 171–6.
- [442] W. Nahm, ‘A proof of modular invariance’, *Intern. J. Mod. Phys.* **A6** (1991) 2837–45.
- [443] W. Nahm, ‘Conformal field theory: a bridge over troubled waters’, *Quantum Field Theory* (New Delhi, Hindustan Book Agency, 2000) 571–604.
- [444] W. Nahm, ‘Conformal field theory and torsion elements of the Bloch group’, Preprint (arXiv: hep-th/0404120).
- [445] H. Nakajima, ‘Geometric construction of representations of affine algebras’, *Proceedings of the International Congress of Mathematicians, Vol. I (Beijing, 2002)* (Beijing, Higher Education Press, 2002) 423–38.
- [446] G. Navarro, *Characters and Blocks of Finite Groups* (Cambridge, Cambridge University Press, 1998).
- [447] P. Nelson, ‘Lectures on strings and moduli spaces’, *Phys. Reports* **149** (1987).
- [448] Yu. A. Neretin, *Representations of Virasoro and Affine Lie algebras*, Encycl. Math. Sci. **22** (New York, Springer, 1994) 157–234.
- [449] S. P. Norton, ‘More on Moonshine’, *Computational Group Theory (Durham, 1982)* (New York, Academic Press, 1984) 185–93.
- [450] S. P. Norton, ‘Generalized moonshine’, *The Arcata Conference on Representations of Finite Groups (Arcata, 1986)*, Proc. Symp. Pure Math. **47** (Providence, American Mathematical Society, 1987) 208–9.
- [451] S. P. Norton, ‘Constructing the Monster’, *Groups, Combinatorics, and Geometry (Durham, 1990)* (Cambridge, Cambridge University Press, 1992) 63–76.

- [452] S. P. Norton, ‘From moonshine to the Monster’, *Proceedings on Moonshine and Related Topics (Montréal, 1999)* (Providence, American Mathematical Society, 2001) 163–71.
- [453] A. Ocneanu, ‘Quantized groups, string algebras and Galois theory for algebras’, *Operator Algebras and Applications*, Vol. 2 (Cambridge, Cambridge University Press, 1988) 119–72.
- [454] A. Ocneanu, ‘Paths on Coxeter diagrams: from Platonic solids and singularities to minimal models and subfactors’, *Lectures on Operator Theory* (Providence, American Mathematical Society, 1999).
- [455] A. Ocneanu, ‘The classification of subgroups of quantum $SU(N)$ ’, *Quantum Symmetries in Theoretical Physics and Mathematics* (Providence, American Mathematical Society, 2002).
- [456] A. Ogg, *Modular Forms and Dirichlet Series* (New York, W. A. Benjamin, 1969).
- [457] V. Ostrik, ‘Module categories over the Drinfeld double of a finite group’, *Int. Math. Res. Not.* (2003) 1507–20.
- [458] V. Ostrik, ‘Module categories, weak Hopf algebras and modular invariants’, *Transform. Groups* **8** (2003) 177–206.
- [459] J. Paris and L. Harrington, ‘A mathematical incompleteness in Peano arithmetic’, *Handbook of Mathematical Logic* (Amsterdam, North-Holland, 1977) 1133–42.
- [460] O. Pekonen, ‘Universal Teichmüller space in geometry and physics’, *J. Geom. Phys.* **15** (1995) 227–51.
- [461] V. B. Petkova and J.-B. Zuber, ‘Conformal boundary conditions and what they teach us’, *Nonperturbative Quantum Field Theory Methods and Their Applications* (Singapore, World Scientific, 2001) 1–35.
- [462] B. Pioline and A. Waldron, ‘Automorphic forms: a physicist’s survey’, Preprint (hep-th/9312068).
- [463] J. Polchinski, *String Theory*, Vol. I and II (Cambridge, Cambridge University Press, 1998).
- [464] V. Prasolov and Y. Solov’ev, *Elliptic Functions and Elliptic Integrals* (Providence, American Mathematical Society, 1997).
- [465] A. Pressley and G. Segal, *Loop Groups* (Oxford, Oxford University Press, 1988).
- [466] L. Queen, ‘Modular functions arising from some finite groups’, *Math. of Comput.* **37** (1981) 547–80.
- [467] F. Quinn, ‘Lectures on axiomatic topological quantum field theory’, *Geometry and Quantum Field Theory (Park City, 1991)* (Providence, American Mathematical Society, 1995) 323–453.
- [468] H. Rademacher and E. Grosswald, *Dedekind Sums* (Washington, Mathematical Association of America, 1972).
- [469] U. Ray, ‘Generalized Kac–Moody algebras and some related topics’, *Bull. Amer. Math. Soc.* **38** (2000) 1–42.
- [470] K.-H. Rehren, ‘Braid group statistics and their superselection rules’, *The Algebraic Theory of Superselection Sectors* (Singapore, World Scientific, 1990) 333–55.
- [471] M. Reid, ‘La correspondance de McKay’, *Séminaire Bourbaki, Astérisque* **276** (2002) 53–72.
- [472] I. Reiten, ‘Dynkin diagrams and the representation theory of algebras’, *Notices Amer. Math. Soc.* **44** (1997) 546–56.
- [473] N. Yu. Reshetikhin and V. G. Turaev, ‘Ribbon graphs and their invariants derived from quantum groups’, *Commun. Math. Phys.* **127** (1990) 1–26.
- [474] N. Yu. Reshetikhin and V. G. Turaev, ‘Invariants of 3-manifolds via link polynomials and quantum groups’, *Invent. Math.* **103** (1991) 547–97.
- [475] C. Reutenauer, *Free Lie Algebras* (New York, Oxford University Press, 1993).
- [476] W. F. Reynolds, ‘Thompson’s characterization of characters and sets of primes’, *J. Alg.* **156** (1993) 237–43.
- [477] A. Rocha-Caridi, ‘Vacuum vector representations of the Virasoro algebra’, *Vertex Operators in Mathematics and Physics (Berkeley, 1983)* (New York, Springer, 1985) 451–73.
- [478] D. Rolfsen, *Knots and Links* (Berkeley, Publish or Perish, 1976).
- [479] P. Roman, *Introduction to Quantum Field Theory* (New York, John Wiley & Sons, 1969).
- [480] M. Rosso, ‘Quantum groups and braid groups’, *Quantum Symmetries (Les Houches, 1995)* (Amsterdam, Elsevier, 1998) 757–85.
- [481] W. Rudin, *Real and Complex Analysis*, 3rd edn (New York, McGraw–Hill, 1987).
- [482] P. Ruelle, E. Thiran and J. Weyers, ‘Implications of an arithmetic symmetry of the commutant for modular invariants’, *Nucl. Phys.* **B402** (1993) 693–708.
- [483] I. Runkel and G. M. T. Watts, ‘A non-rational CFT with central charge 1’, *Fortsch. Phys.* **50** (2002) 959–65.
- [484] A. J. E. Ryba, ‘Modular moonshine?’, *Moonshine, the Monster, and Related Topics (South Hadley, 1994)* *Contemp. Math.* **193** (Providence, American Mathematical Society, 1996) 307–36.

- [485] D. G. Saari and Z. Xia, ‘Off to infinity in finite time’, *Notices Amer. Math. Soc.* **42** (1995) 538–46.
- [486] G. Sansone and J. Gerretsen, *Lectures on the Theory of Functions of a Complex Variable*, Vol. II (Groningen, Wolters-Noordhoff, 1969).
- [487] S. Sawin, ‘Links, quantum groups, and TQFTs’, *Bull. Amer. Math. Soc.* **33** (1996) 413–45.
- [488] A. N. Schellekens, ‘Meromorphic $c = 24$ conformal field theories’, *Commun. Math. Phys.* **153** (1993) 159–85.
- [489] A. N. Schellekens and S. Yankielowicz, ‘Extended chiral algebras and modular invariant partition functions’, *Nucl. Phys.* **B327** (1989) 673–703.
- [490] R. Schimmrigk and S. Underwood, ‘The Shimura–Taniyama Conjecture and conformal field theory’, *J. Geom. Phys.* **48** (2003) 169–89.
- [491] M. Schlichenmaier and O. K. Sheinman, ‘The Wess–Zumino–Witten–Novikov theory, Knizhnik–Zamolodchikov equations, and Krichever–Novikov algebras, I’, *Russian Math. Surveys* **54** (1999) 213–49.
- [492] M. Schlichenmaier and O. K. Sheinman, ‘The Wess–Zumino–Witten–Novikov theory, Knizhnik–Zamolodchikov equations, and Krichever–Novikov algebras, II’, Preprint (arXiv: math.MG/0410048).
- [493] L. Schneps, ‘The Grothendieck–Teichmüller group \widehat{GT} : a survey’, *Geometric Galois Actions*, Vol. 1 (Cambridge, Cambridge University Press, 1997) 183–203.
- [494] L. Schneps, ‘Fundamental groupoids of genus zero moduli spaces and braided tensor categories’, *Moduli Spaces of Curves, Mapping Class Groups, and Field Theory* (Providence, American Mathematical Society, 2003) 59–104.
- [495] M. Schottenloher, *A Mathematical Introduction to Conformal Field Theory* (Berlin, Springer, 1997).
- [496] C. Schweigert, J. Fuchs and J. Walcher, ‘Conformal field theory, boundary conditions and applications to string theory’, Preprint (arXiv: hep-th/0011109).
- [497] P. Scott, ‘The geometries of 3-manifolds’, *Bull. London Math. Soc.* **15** (1983) 401–87.
- [498] G. Segal, ‘The definition of conformal field theory’, *Differential Geometric Methods in Theoretical Physics (Como, 1987)* (Boston, Academic Press, 1988) 165–71.
- [499] G. Segal, ‘Elliptic cohomology’, *Séminaire Bourbaki 1987–88, no. 695, Astérisque* **161–162** (1988) 187–201.
- [500] G. Segal, ‘Two-dimensional conformal field theories and modular functors’, *IXth Proceedings of the International Congress of Mathematical Physics (Swansea, 1988)* (Bristol, Hilger, 1989) 22–37.
- [501] G. Segal, ‘Geometric aspects of quantum field theories’, *Proceedings of the International Congress of Mathematicians (Kyoto, 1990)* (Hong Kong, Springer, 1991) 1387–96.
- [502] G. Segal, ‘The definition of conformal field theory’, *Topology, Geometry and Quantum Field Theory (Oxford, 2002)* (Cambridge, Cambridge University Press, 2004) 423–577.
- [503] J.-P. Serre, *A Course in Arithmetic* (Berlin, Springer, 1973).
- [504] I. R. Shafarevich, *Algebra I. Basic Notions of Algebra*, Encycl. Math. Sci. **11** (New York, Springer, 1990).
- [505] G. Shimura, *Introduction to the Arithmetic Theory of Automorphic Functions* (Princeton, Princeton University Press, 1971).
- [506] G. Shimura, *Abelian Varieties and Complex Multiplication* (Princeton, Princeton University Press, 1998).
- [507] C. L. Siegel, ‘A simple proof of $\eta(-1/\tau) = \eta(\tau)\sqrt{\tau/\bar{\tau}}$ ’, *Mathematika* **1** (1954) 4.
- [508] S. Singh, *Fermat’s Enigma* (London, Penguin Books, 1997).
- [509] P. Slodowy, ‘Platonic solids, Kleinian singularities, and Lie groups’, *Algebraic Geometry (Ann Arbor, 1981)* Lecture Notes in Math. **1008** (Berlin, Springer, 1983) 102–38.
- [510] G. W. Smith, ‘Replicant powers for higher genera’, *Moonshine, the Monster, and Related Topics (South Hadley, 1994)* Contemp. Math. **193** (Providence, American Mathematical Society, 1996) 337–52.
- [511] S. D. Smith, ‘On the head characters of the Monster simple group’, *Finite Groups – Coming of Age (Montréal, 1982)*, Contemp. Math. **45** (Providence, American Mathematical Society, 1996).
- [512] R. Solomon, ‘A brief history of the classification of the finite simple groups’, *Bull. Amer. Math. Soc.* **38** (2001) 315–52.
- [513] J. Stasheff, ‘Differential graded Lie algebras, quasi-Hopf algebras and higher homotopy algebras’, *Quantum Groups (Leningrad, 1990)*, Lecture Notes in Math. **1510** (Berlin, Springer, 1992) 120–37.

- [514] J. Stasheff, ‘Homological (ghost) methods in mathematical physics’, *Infinite-dimensional Geometry, Non-commutative Geometry, Operator Algebras, and Fundamental Interactions (Saint-Francois, 1993)* (Singapore, World Scientific, 1995) 242–64.
- [515] I. N. Stewart and D. O. Tall, *Algebraic Number Theory* (London, Chapman & Hall, 1979).
- [516] P. F. Stiller, ‘Classical automorphic functions and hypergeometric functions’, *J. Number Theory* **28** (1988) 219–32.
- [517] S. Stolz and P. Teichner, ‘What is an elliptic object?’, *Topology, Geometry and Quantum Field Theory (Oxford, 2002)* (Cambridge, Cambridge University Press, 2004) 247–343.
- [518] R. F. Streater and A. S. Wightman, *PCT, Spin and Statistics, and All That* (Princeton, Princeton University Press, 1989).
- [519] T. Takayanagi, ‘Modular invariance of strings on pp-waves with RR-flux’, *J. High Energy Physics* **0212** (2002) 022.
- [520] L. A. Takhtajan, ‘Quantum field theory on an algebraic curve’, *Lett. Math. Phys.* **52** (2000) 79–91.
- [521] H. Tamanoi, *Elliptic Genera and Vertex Operator Superalgebras*, Lecture Notes in Math. **1704** (Berlin, Springer, 1999).
- [522] A. Terras, *Fourier Analysis on Finite Groups and Applications* (Cambridge, Cambridge University Press, 1999).
- [523] C. B. Thomas, *Elliptic Cohomology* (New York, Kluwer, 1999).
- [524] J. G. Thompson, ‘Finite groups and modular functions’, *Bull. London Math. Soc.* **11** (1979) 347–51.
- [525] J. G. Thompson, ‘Some numerology between the Fischer–Griess Monster and the elliptic modular function’, *Bull. Lond. Math. Soc.* **11** (1979) 352–3.
- [526] J. G. Thompson, ‘A finiteness theorem for subgroups of $\mathrm{PSL}(2, \mathbb{R})$ which are commensurable with $\mathrm{PSL}(2, \mathbb{Z})$ ’, *Santa Cruz Conference on Finite Groups (Santa Cruz, 1979)*, Proc. Symp. Pure Math. **37** (Providence, American Mathematical Society, 1980) 533–55.
- [527] W. Thurston, *Three-dimensional Geometry and Topology*, Vol. 1 (Princeton, Princeton University Press, 1997).
- [528] J. Tits, ‘On R. Griess’ “Friendly Giant”, *Invent. Math.* **78** (1984) 491–9.
- [529] L. Toti Rigatelli, *Evariste Galois* (Basel, Birkhäuser, 1996).
- [530] A. Tsuchiya, K. Ueno and Y. Yamada, ‘Conformal field theory on universal family of stable curves with gauge symmetries’, *Integrable Systems in Quantum Field Theory and Statistical Mechanics*, Adv. Stud. Pure Math. **19** (Boston, Academic Press, 1989) 459–566.
- [531] I. Tuba and H. Wenzl, ‘Representations of the braid group B_3 and of $\mathrm{SL}(2, \mathbb{Z})$ ’, *Pac. J. Math.* **197** (2001) 491–510.
- [532] M. Tuine, ‘On the relationship between Monstrous moonshine and the uniqueness of the Moonshine module’, *Commun. Math. Phys.* **166** (1995) 495–532.
- [533] M. P. Tuine, ‘Genus two meromorphic conformal field theory’, *Proceedings on Moonshine and Related Topics (Montréal, 1999)* (Providence, American Mathematical Society, 2001) 231–51.
- [534] V. G. Turaev, *Quantum Invariants of Knots and 3-manifolds* (Berlin, de Gruyter, 1994).
- [535] V. G. Turaev and O. Y. Viro, ‘State sum invariants of 3-manifolds and quantum 6j-symbols’, *Topology* **31** (1992) 865–902.
- [536] K. Ueno, ‘Introduction to conformal field theory with gauge symmetries’, *Geometry and Physics (Aarhus, 1995)* (New York, Dekker, 1997) 603–745.
- [537] K. Ueno, *Algebraic Geometry 1 and 2* (Providence, American Mathematical Society, 1997).
- [538] C. Vafa, ‘Modular invariance and discrete torsion on orbifolds’, *Nucl. Phys.* **B273** (1986) 592–606.
- [539] C. Vafa, ‘Conformal theories and punctured surfaces’, *Phys. Lett.* **B199** (1987) 195–202.
- [540] C. Vafa and E. Witten, ‘A strong coupling test of S-duality’, *Nucl. Phys.* **B431** (1994) 3–77.
- [541] A. Varchenko, *Multidimensional Hypergeometric Functions and Representation Theory of Lie Groups and Quantum Groups* (Singapore, World Scientific, 1995).
- [542] E. Verlinde, ‘Fusion rules and modular transformations in 2D conformal field theory’, *Nucl. Phys.* **B300** (1988) 360–76.
- [543] D.-N. Verma, ‘The rôle of affine Weyl groups in the representation theory of algebraic Chevalley groups and their Lie groups’, *Lie Groups and Their Representations (Budapest, 1971)* (New York, Halsted, 1975) 653–705.
- [544] H. Verrill and N. Yui, ‘Thompson series and the mirror maps of pencils of K3 surfaces’, *The Arithmetic and Geometry of Algebraic Cycles (Banff, 1998)* (Providence, American Mathematical Society, 2000) 399–432.

- [545] V. S. Vladimirov, I. V. Volovich and E. I. Zelenov, *p-adic Analysis and Mathematical Physics* (Singapore, World Scientific, 1994).
- [546] S. G. Vladut, *Kronecker's Jugendtraum and Modular Forms* (Amsterdam, Gordon & Breach, 1991).
- [547] P. Vogel, 'The universal Lie algebra' (Preprint, 1999).
- [548] H. Völklein, *Groups as Galois Groups. An Introduction* (Cambridge, Cambridge University Press, 1996).
- [549] H. Völklein, 'The braid group and linear rigidity', *Geom. Dedic.* **84** (2001) 135–50.
- [550] B. Wajnryb, 'A simple presentation for the mapping class group of an orientable surface', *Israel J. Math.* **45** (1983) 157–74; errata: *Israel J. Math.* **88** (1994) 425–7.
- [551] M. Wakimoto, *Infinite-Dimensional Lie Algebras* (Providence, American Mathematical Society, 2001).
- [552] M. A. Walton, 'Algorithm for WZW fusion rules: a proof', *Phys. Lett.* **B241** (1990) 365–8.
- [553] M. A. Walton, 'Affine Kac–Moody algebras and the Wess–Zumino–Witten model', *Conformal Field Theory* (Cambridge, MA, Perseus Publishing, 2000) 67 pages.
- [554] A. J. Wassermann, 'Operator algebras and conformal field theory', *Proceedings of the International Congress of Mathematicians (Zürich, 1994)* (Basel, Birkhäuser, 1995) 966–79.
- [554a] A. Weil, 'Sur certains groupes d'opérateurs unitaires,' *Acta Math* **111** (1964) 143–211.
- [555] S. Weinberg, *The Quantum Theory of Fields*, Vols I, II (Cambridge, Cambridge University Press, 1995).
- [556] J. A. Wheeler and W. H. Zurek (eds), *Quantum Theory and Measurement* (Princeton, Princeton University Press, 1983).
- [557] F. Wilczek, *Fractional Statistics and Anyon Superconductivity* (Singapore, World Scientific, 1990).
- [558] K. G. Wilson, 'Non-Lagrangian models of current algebras', *Phys. Rev.* **179** (1969) 1499–512.
- [559] R. L. Wilson, 'Simple Lie algebras over fields of prime characteristic', *Proceedings of the International Congress of Mathematicians (Berkeley, 1986)* (Providence, American Mathematical Society, 1987) 407–16.
- [560] E. Witten, 'Physics and geometry', *Proc. Intern. Congr. Math. (Berkeley, 1986)* (Providence, American Mathematical Society, 1987) 267–303.
- [561] E. Witten, 'Elliptic genera and quantum field theory', *Commun. Math. Phys.* **109** (1987) 525–36.
- [562] E. Witten, 'Quantum field theory, Grassmannians, and algebraic curves', *Commun. Math. Phys.* **113** (1988) 529–600.
- [563] E. Witten, 'Coadjoint orbits of the Virasoro group', *Commun. Math. Phys.* **114** (1988) 1–53.
- [564] E. Witten, 'Geometry and quantum field theory', *Mathematics into the Twenty-first Century*, Vol. II (Providence, American Mathematical Society, 1992) 479–91.
- [565] E. Witten, 'The Verlinde formula and the cohomology of the Grassmannian', *Geometry, Topology and Physics (Harvard, 1993)* (Cambridge, International Press, 1995) 357–422.
- [566] E. Witten, 'Magic, mystery, and matrix', *Notices Amer. Math. Soc.* **45** (1998) 1124–9.
- [567] E. Witten, 'Perturbative quantum field theory', *Quantum Fields and Strings: A Course for Mathematicians*, Vol. 1 (Providence, American Mathematical Society, 1999) 419–73.
- [568] F. Xu, 'Algebraic orbifold conformal field theories', *Mathematical Physics in Mathematics and Physics (Sienna, 2000)* (Providence, American Mathematical Society, 2001) 429–48.
- [569] C. T. Yang, 'Hilbert's fifth problem and related problems on transformation groups', *Mathematical Developments Arising from Hilbert Problems*, Proc. Symp. Pure Math. **28** (Providence, American Mathematical Society, 1976) 142–6.
- [570] D. N. Yetter, *Functorial Knot Theory* (Singapore, World Scientific, 2001).
- [571] N. Yui, 'Update on the modularity of Calabi–Yau varieties', *Calabi–Yau Varieties and Mirror Symmetry (Toronto, 2001)* (Providence, American Mathematical Society, 2003) 307–62.
- [572] D. Zagier, 'A one-sentence proof that every prime $p \equiv 1 \pmod{4}$ is a sum of two squares', *Amer. Math. Monthly* **97** (1990) 144.
- [573] Y. Zhu, 'Global vertex operators on Riemann surfaces', *Commun. Math. Phys.* **165** (1994) 485–531.
- [574] Y. Zhu, 'Modular invariance of characters of vertex operator algebras', *J. Amer. Math. Soc.* **9** (1996) 237–302.
- [575] J.-B. Zuber, 'CFT, BCFT, ADE and all that', *Quantum Symmetries in Theoretical Physics and Mathematics (Bariloche, 2000)* (Providence, American Mathematical Society, 2002) 233–66.