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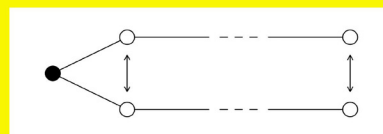
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**LIE GROUPS
BEYOND
AN INTRODUCTION**
Digital Second Edition

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Lie Groups Beyond an Introduction, Digital Second Edition

Pages vii–xviii and 1–812 are the same in the digital and printed second editions. A list of corrections as of June 2023 has been included as pages 813–820 of the digital second edition. The corrections have not been implemented in the text.

Cover: Vogan diagram of $\mathfrak{sl}(2n, \mathbb{R})$. See page 399.

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REFERENCES

In the text of this book, a name followed by a bracketed year points to the list that follows. The year is followed by a letter in case of ambiguity. The bracketed year for a book is normally the year of the first edition.

- Adams, J., D. Barbasch, and D. A. Vogan, *The Langlands Classification and Irreducible Characters for Real Reductive Groups*, Birkhäuser, Boston, 1992.
- Adams, J. F., *Lectures on Lie Groups*, W. A. Benjamin, New York, 1969. Reprinted: University of Chicago Press, Chicago, 1982.
- Ado, I. D., Note on the representation of finite continuous groups by means of linear substitutions, *Bulletin de la Société Physico-Mathématique de Kazan* 7 (1935), 3–43 (Russian).
- Ado, I. D., The representation of Lie algebras by matrices, *Uspehi Matematicheskikh Nauk* 2 (1947), No. 6 (22), 159–173 (Russian). English translation: *Amer. Math. Soc. Translation*, Vol. 2, 1949; reissued as: *Amer. Math. Soc. Translations* (1) 9 (1962), 308–327.
- Alekseevskii, D. V., Compact quaternionic spaces, *Funktsional’nyi Analiz i Ego Prilozheniya* 2 (1968), No. 2, 11–20 (Russian). English translation: *Functional Anal. and Its Appl.* 2 (1968), 106–114.
- Araki, S., On root systems and an infinitesimal classification of irreducible symmetric spaces, *J. of Math., Osaka City Univ.* 13 (1962), 1–34.
- Arthur, J., *Automorphic Forms Seminar*, lectures at the Institute for Advanced Study, Fall 2000.
- Artin, E., The influence of J. H. M. Wedderburn on the development of modern algebra, *Bull. Amer. Math. Soc.* 56 (1950), 65–72. (= *Collected Papers*, Springer-Verlag, New York, 1965, pp. 526–533.)
- Artin, E., *Geometric Algebra*, Interscience, New York, 1957.
- Artin, M., *Algebra*, Prentice-Hall, Englewood Cliffs, N.J., 1991.
- Baez, J. C., The octonions, *Bull. Amer. Math. Soc.* 39 (2002), 145–205. Republished with corrections in the Los Alamos mathematics arXiv: <http://arXiv.org/abs/math.RA/0105155>.
- Bailey, T. N., and A. W. Knap (eds.), *Representation Theory and Automorphic Forms*, Proceedings Symposia in Pure Mathematics, Vol. 61, American Mathematical Society, Providence, R.I., 1997.
- Baker, A., *Matrix Groups: An Introduction to Lie Group Theory*, Springer-Verlag, London, 2002.
- Baker, H. F., Alternants and continuous groups, *Proc. London Math. Soc.* (2) 3 (1905), 24–47.

- Bala, P., and R. W. Carter, The classification of unipotent and nilpotent elements, *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen Ser. A* 77 (1974) (= *Indagationes Mathematicae* 36 (1974)), 94–97.
- Bala, P., and R. W. Carter, Classes of unipotent elements in simple algebraic groups I, II, *Math. Proc. Cambridge Philos. Soc.* 79 (1976), 401–425; 80 (1976), 1–17.
- Baldoni Silva, M. W., Branching theorems for semisimple Lie groups of real rank one, *Rend. Sem. Math. Univ. Padova* 61 (1979), 229–250.
- Baston, R. J., and M. G. Eastwood, *The Penrose Transform: Its Interaction with Representation Theory*, Oxford University Press, Oxford, 1989.
- Bélanger, G., Branching rules for irreducible representations of E_8 into D_8 , *J. Physics A* 16 (1983), 3421–3433.
- Berger, M., Les espaces symétriques non compacts, *Annales Sci. École Norm. Sup.* 74 (1957), 85–177.
- Bernstein, I. N., I. M. Gelfand, and S. I. Gelfand, Structure of representations generated by vectors of highest weight, *Funktsional'nyi Analiz i Ego Prilozheniya* 5 (1971), No. 1, 1–9 (Russian). English translation: *Functional Analysis and Its Applications* 5 (1971), 1–8. (= Gelfand, I. M., *Collected Papers*, Vol. II, pp. 556–563.)
- Besse, A. L., *Einstein Manifolds*, Springer-Verlag, New York, 1987.
- Bianchi, L., *Lezioni sulla Teoria dei Gruppi Continui Finiti di Trasformazioni*, Enrico Spoerri, Pisa, 1903.
- Birkhoff, Garrett, Representability of Lie algebras and Lie groups by matrices, *Annals of Math.* 38 (1937), 526–533.
- Bochner, S., and J. von Neumann, Almost periodic functions in groups II, *Trans. Amer. Math. Soc.* 37 (1935), 21–50. (= Bochner, *Collected Papers*, Vol. II, American Mathematical Society, Providence, R.I., 1992, pp. 255–285.) (= von Neumann, *Collected Works*, Vol. II, pp. 528–557.)
- Boerner, H., *Representations of Groups*, North-Holland, Amsterdam, 1963. Second English edition: 1970.
- Borel, A., Représentations linéaires et espaces homogènes kähleriens des groupes simples compacts, unpublished notes, 1954. (= *Oeuvres*, Vol. I, pp. 392–396.)
- Borel, A., Groupes linéaires algébriques, *Annals of Math.* 64 (1956), 20–82. (= *Oeuvres*, Vol. I, pp. 490–552.)
- Borel, A., Introduction to automorphic forms, *Algebraic Groups and Discontinuous Subgroups*, Proceedings Symposia in Pure Mathematics, Vol. 9, American Mathematical Society, Providence, R.I., 1966, pp. 199–210. (= *Oeuvres*, Vol. II, pp. 685–696.)
- Borel, A., *Linear Algebraic Groups*, W. A. Benjamin, New York, 1969. Second edition: Springer-Verlag, New York, 1991. Second edition reprinted: 1997.
- Borel, A., Formes automorphes et séries de Dirichlet (d'après R. P. Langlands), Exposé 466, *Séminaire Bourbaki*, Vol. 1974/75, Exposés 453–470, Lecture Notes in Mathematics, Vol. 514, Springer-Verlag, Berlin, 1976, pp. 183–222. (= *Oeuvres*, Vol. III, pp. 374–398.)
- Borel, A., *Oeuvres*, *Collected Papers*, I, II, III, Springer-Verlag, Berlin, 1983; IV, Springer-Verlag, Berlin, 2001a.
- Borel, A., *Semisimple Groups and Riemannian Symmetric Spaces*, Hindustan Book Agency, New Delhi, 1998.
- Borel, A., *Essays in the History of Lie Groups and Algebraic Groups*, History of Mathematics, Vol. 21, American Mathematical Society, Providence, R.I., 2001b.

- Borel, A., and W. Casselman (eds.), *Automorphic Forms, Representations, and L-Functions*, Proceedings Symposia in Pure Mathematics, Vol. 33, American Mathematical Society, Providence, R.I., 1979.
- Borel, A., and J. de Siebenthal, Les sous-groupes fermés de rang maximum des groupes de Lie clos, *Comment. Math. Helv.* 23 (1949), 200–221. (= Borel, *Oeuvres*, Vol. I, pp. 11–32.)
- Borel, A., and G. D. Mostow (eds.), *Algebraic Groups and Discontinuous Subgroups*, Proceedings Symposia in Pure Mathematics, Vol. 9, American Mathematical Society, Providence, R.I., 1966.
- Bott, R., Homogeneous vector bundles, *Annals of Math.* 66 (1957), 203–248.
- Bourbaki, N., *Eléments de Mathématique, Livre II, Algèbre: Chapitre 8, Modules et Anneaux Semi-Simples*, Actualités Scientifiques et Industrielles, Vol. 1261, Hermann, Paris, 1958.
- Bourbaki, N., *Eléments de Mathématique, Groupes et Algèbres de Lie: Chapitre 1, Algèbres de Lie*, Actualités Scientifiques et Industrielles, Vol. 1285, Hermann, Paris, 1960. Reprinted as Chapitre I: 1971.
- Bourbaki, N., *Eléments de Mathématique, Livre VI, Intégration: Chapitre 7, Mesure de Haar, Chapitre 8, Convolution et Représentations*, Actualités Scientifiques et Industrielles, Vol. 1306, Hermann, Paris, 1963.
- Bourbaki, N., *Eléments de Mathématique, Groupes et Algèbres de Lie: Chapitres IV, V et VI*, Actualités Scientifiques et Industrielles, Vol. 1337, Hermann, Paris, 1968.
- Bourbaki, N., *Eléments de Mathématique, Groupes et Algèbres de Lie: Chapitres II et III*, Actualités Scientifiques et Industrielles, Vol. 1349, Hermann, Paris, 1972.
- Bourbaki, N., *Eléments de Mathématique, Groupes et Algèbres de Lie: Chapitres VII et VIII*, Actualités Scientifiques et Industrielles, Vol. 1364, Hermann, Paris, 1975.
- Bourbaki, N., *Eléments de Mathématique, Groupes et Algèbres de Lie: Chapitre 9, Groupes de Lie Réels Compacts*, Masson, Paris, 1982.
- Brauer, R., Eine Bedingung für vollständige Reduzibilität von Darstellungen gewöhnlicher und infinitesimaler Gruppen, *Math. Zeitschrift* 41 (1936), 330–339. (= *Collected Papers*, Vol. III, MIT Press, Cambridge, Mass., 1980, pp. 462–471.)
- Bremmer, M. R., R. V. Moody, and J. Patera, *Tables of Dominant Weight Multiplicities for Representations of Simple Lie Algebras*, Marcel Dekker, New York, 1985.
- Bröcher, T., and T. tom Dieck, *Representations of Compact Lie Groups*, Springer-Verlag, Berlin, 1985. Reprinted with corrections: 1995.
- Bruhat, F., Représentations induites des groupes de Lie semi-simples complexes, *C. R. Acad. Sci. Paris* 238 (1954a), 437–439.
- Bruhat, F., Représentations induites des groupes de Lie semi-simples réels, *C. R. Acad. Sci. Paris* 238 (1954b), 550–553.
- Bruhat, F., Sur les représentations induites des groupes de Lie, *Bull. Soc. Math. France* 84 (1956), 97–205.
- Burnside, W., On the representations of a group of finite order as an irreducible group of linear substitutions and the direct establishment of the relations between the group-characteristics, *Proc. London Math. Soc.* (2) 1 (1904), 117–123.
- Campbell, J. E., On a law of combination of operators bearing on the theory of continuous transformation groups, *Proc. London Math. Soc.* (1) 28 (1897), 381–390.
- Campbell, J. E., On a law of combination of operators (second paper), *Proc. London Math. Soc.* (1) 29 (1898), 14–32.

- Cartan, É., Sur la structure des groupes de transformations finis et continus, *Thèse*, Nony, Paris, 1894. Reprinted: Vuibert, 1933. (= *Œuvres Complètes*, Vol. I, pp. 137–287.)
- Cartan, É., Les groupes projectifs qui ne laissent invariante aucune multiplicité plane, *Bull. Soc. Math. France* 41 (1913), 53–96. (= *Œuvres Complètes*, Vol. I, pp. 355–398.)
- Cartan, É., Les groupes réels simples finis et continus, *Annales Sci. École Norm. Sup.* 31 (1914), 263–355. (= *Œuvres Complètes*, Vol. I, pp. 399–491.)
- Cartan, É., Les tenseurs irréductibles et les groupes linéaires simples et semi-simples, *Bull. des Sci. Math.* 49 (1925a), 130–152. (= *Œuvres Complètes*, Vol. I, pp. 531–553.)
- Cartan, É., Le principe de dualité et la théorie des groupes simples et semi-simples, *Bull. des Sci. Math.* 49 (1925b), 361–374. (= *Œuvres Complètes*, Vol. I, pp. 555–568.)
- Cartan, É., Sur une classe remarquable d’espaces de Riemann, *Bull. Soc. Math. France* 55 (1927a), 114–134. (= *Œuvres Complètes*, Vol. I, pp. 639–659.)
- Cartan, É., Sur certaines formes riemanniennes remarquables des géométries à groupe fondamental simple, *Annales Sci. École Norm. Sup.* 44 (1927b), 345–467. (= *Œuvres Complètes*, Vol. I, pp. 867–989.)
- Cartan, É., Groupes simples clos et ouverts et géométrie riemannienne, *J. de Math. Pures et Appliquées* 8 (1929a), 1–33. (= *Œuvres Complètes*, Vol. I, pp. 1011–1043.)
- Cartan, É., Sur la détermination d’un système orthogonal complet dans un espace de Riemann symétrique clos, *Rend. Circ. Mat. Palermo* 53 (1929b), 217–252. (= *Œuvres Complètes*, Vol. I, pp. 1045–1080.)
- Cartan, É., Le troisième théorème fondamental de Lie, *C. R. Acad. Sci. Paris* 190 (1930a), 914–916 and 1005–1007. (= *Œuvres Complètes*, Vol. I, pp. 1143–1148.)
- Cartan, É., *La Théorie des Groupes Finis et Continus et L’Analysis Situs*, Mémorial des Sciences Mathématiques, Vol. 42, Gauthiers-Villars, Paris, 1930b. (= *Œuvres Complètes*, Vol. I, pp. 1165–1225.)
- Cartan, É., Sur les domaines bornés homogènes de l’espace de n variables complexes, *Abhandlungen aus dem Mathematischen Seminar der Hamburgischen Universität* 11 (1935), 116–162. (= *Œuvres Complètes*, Vol. I, pp. 1259–1305.)
- Cartan, É., Les représentations linéaires des groupes de Lie, *J. de Math. Pures et Appliquées* 17 (1938a), 1–12; correction 17 (1938), 438. (= *Œuvres Complètes*, Vol. I, pp. 1339–1351.)
- Cartan, É., *Leçons sur la Théorie des Spineurs* I, II, Hermann, Paris, 1938b. English translation: *The Theory of Spinors*, Hermann, Paris, 1966. English translation reprinted: Dover, New York, 1981.
- Cartan, É., *Œuvres Complètes*, I, II, III, Gauthiers-Villars, Paris, 1952. Reprinted: Centre National de la Recherche Scientifique, Paris, 1984.
- Cartier, P., Représentations linéaires des algèbres de Lie semi-simples, Exposé 17, Séminaire “Sophus Lie,” *Théorie des Algèbres de Lie, Topologie des Groupes de Lie*, 1954–55, École Normale Supérieure, Paris, 1955a.
- Cartier, P., Structure topologique des groupes de Lie généraux, Exposé 22, Séminaire “Sophus Lie,” *Théorie des Algèbres de Lie, Topologie des Groupes de Lie*, 1954–55, École Normale Supérieure, Paris, 1955b.
- Cartier, P., Remarks on “Lie algebra cohomology and the generalized Borel-Weil theorem,” by B. Kostant, *Annals of Math.* 74 (1961a), 388–390.
- Cartier, P., On H. Weyl’s character formula, *Bull. Amer. Math. Soc.* 67 (1961b), 228–230.
- Casimir, H., and B. L. van der Waerden, Algebraischer Beweis der vollständigen

- Reduzibilität der Darstellungen halbeinfacher Liescher Gruppen, *Math. Annalen* 111 (1935), 1–12.
- Chevalley, C., *Theory of Lie Groups*, I, Princeton University Press, Princeton, 1946. Reprinted: 1999.
- Chevalley, C., Algebraic Lie algebras, *Annals of Math.* 48 (1947), 91–100.
- Chevalley, C., Sur la classification des algèbres de Lie simples et de leurs représentations, *C. R. Acad. Sci. Paris* 227 (1948a), 1136–1138.
- Chevalley, C., Sur les représentations des algèbres de Lie simples, *C. R. Acad. Sci. Paris* 227 (1948b), 1197.
- Chevalley, C., *Théorie des Groupes de Lie, Tome II, Groupes Algébriques*, Actualités Scientifiques et Industrielles, Vol. 1152, Hermann, Paris, 1951.
- Chevalley, C., *Théorie des Groupes de Lie, Tome III, Théorèmes Généraux sur les Algèbres de Lie*, Actualités Scientifiques et Industrielles, Vol. 1226, Hermann, Paris, 1955a.
- Chevalley, C., Invariants of finite groups generated by reflections, *Amer. J. Math.* 77 (1955b), 778–782.
- Cohn, P. M., *Lie Groups*, Cambridge University Press, London, 1957.
- Coxeter, H. S. M., Discrete groups generated by reflections, *Annals of Math.* 35 (1934), 588–621.
- Curtis, M. L., *Matrix Groups*, Springer-Verlag, New York, 1979. Second edition: 1984.
- Deenen, J., and C. Quesne, Canonical solution of the state labelling problem for $SU(n) \supset SO(n)$ and Littlewood's branching rule I, *J. Physics A* 16 (1983), 2095–2104.
- Dixmier, J., *Algèbres Enveloppantes*, Gauthier-Villars Editeur, Paris, 1974. English translation: *Enveloping Algebras*, North-Holland Publishing Co., Amsterdam, 1977.
- Duistermaat, J. J., and J. A. C. Kolk, *Lie Groups*, Springer-Verlag, Berlin, 2000.
- Dynkin, E., Classification of the simple Lie groups, *Recueil Mathématique (= Matematicheskii Sbornik)* 18 (60) (1946), 347–352 (Russian with English summary).
- Dynkin, E. B., The structure of semi-simple algebras, *Uspehi Matematicheskikh Nauk* 2 (1947), No. 4 (20), 59–127 (Russian). English translation: *Amer. Math. Soc. Translation*, Vol. 17, 1950; reissued as: The structure of semisimple algebras, *Amer. Math. Soc. Translations* (1) 9 (1962), 328–469.
- Dynkin, E. B., Normed Lie algebras and analytic groups, *Uspehi Matematicheskikh Nauk* 5 (1950), No. 1 (35), 135–186 (Russian). English translation: *Amer. Math. Soc. Translation*, Vol. 97, 1953; reissued as: *Amer. Math. Soc. Translations* (1) 9 (1962), 470–534.
- Dynkin, E. B., Semisimple subalgebras of semisimple Lie algebras, *Matematicheskii Sbornik* 30 (72) (1952), 349–462 (Russian). English translation: *Amer. Math. Soc. Translations* (2) 6 (1957), 111–244.
- Eisenhart, L. P., *Continuous Groups of Transformations*, Princeton University Press, Princeton, 1933.
- Engel, F., Sur un groupe simple à quatorze paramètres, *C. R. Acad. Sci. Paris* 116 (1893), 786–788.
- Freudenthal, H., and H. de Vries, *Linear Lie Groups*, Academic Press, New York, 1969.
- Frobenius, F. G., Über Gruppencharaktere, *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin* (1896), 985–1021. (= *Gesammelte Abhandlungen*, Vol. III, Springer-Verlag, Berlin, 1968, pp. 1–37.)

- Fulton, W., and J. Harris, *Representation Theory, A First Course*, Springer-Verlag, New York, 1991. Reprinted: 1997.
- Gantmacher, F., Canonical representation of automorphisms of a complex semi-simple Lie group, *Recueil Mathématique* (= *Matematicheskii Sbornik*) 5 (47) (1939a), 101–146 (English with Russian summary).
- Gantmacher, F., On the classification of real simple Lie groups, *Recueil Mathématique* (= *Matematicheskii Sbornik*) 5 (47) (1939b), 217–250 (English with Russian summary).
- Gaskell, R., and R. T. Sharp, Generating functions for G_2 characters and subgroup branching rules, *J. Math. Physics* 22 (1981), 2736–2739.
- Gelbart, S. S., A theory of Stiefel harmonics, *Trans. Amer. Math. Soc.* 192 (1974), 29–50.
- Gelfand, I. M., Center of the infinitesimal group ring, *Matematicheskii Sbornik* 26 (68) (1950), 103–112 (Russian). English translation: *Collected Papers*, Vol. II, pp. 22–30.
- Gelfand, I. M., *Collected Papers*, I, II, III, Springer-Verlag, Berlin, 1988.
- Gelfand, I. M., and M. A. Naimark, *Unitary Representations of the Classical Groups*, Trudy Mat. Inst. Steklov 36, Moscow-Leningrad, 1950 (Russian). German translation: Akademie-Verlag, Berlin, 1957.
- Gelfand, I. M., and M. L. Tsetlin, Finite-dimensional representations of the group of unimodular matrices, *Doklady Akademii Nauk SSSR* 71 (1950), 825–828 (Russian). English translation: *Collected Papers*, Vol. II, 653–656.
- Gindikin, S. G., and F. I. Karpelevič, Plancherel measure for Riemann symmetric spaces of nonpositive curvature, *Doklady Akademii Nauk SSSR* 145 (1962), 252–255 (Russian). English translation: *Soviet Math. Doklady* 3 (1962), 962–965.
- Godement, R., A theory of spherical functions I, *Trans. Amer. Math. Soc.* 73 (1952), 496–556.
- Godement, R., *Introduction à la Théorie des Groupes de Lie*, I, II, Université de Paris VII, Paris, 1982.
- Goodman, R., and N. R. Wallach, *Representations and Invariants of the Classical Groups*, Encyclopedia of Mathematics and Its Applications, Vol. 68, Cambridge University Press, Cambridge, 1998. Reprinted: 2000.
- Goto, M., Faithful representations of Lie groups I, *Math. Japonicae* 1 (1948), 107–119.
- Goto, M., On an arcwise connected subgroup of a Lie group, *Proc. Amer. Math. Soc.* 20 (1969), 157–162.
- Greenleaf, S., *Decompositions of Group Actions on Symmetric Tensors*, Thesis, State University of New York at Stony Brook, 2000.
- Gross, B. H., and N. R. Wallach, A distinguished family of unitary representations for the exceptional groups of real rank = 4, *Lie Theory and Geometry: In Honor of Bertram Kostant*, Birkhäuser, Boston, 1994, pp. 289–304.
- Gross, B. H., and N. R. Wallach, On quaternionic discrete series representations, and their continuations, *J. Reine Angew. Math.* 481 (1996), 73–123.
- Gross, K. I., and R. A. Kunze, Finite dimensional induction and new results on invariants for classical groups I, *Amer. J. Math.* 106 (1984), 893–974.
- Haar, A., Der Maassbegriff in der Theorie der Kontinuierlichen Gruppen, *Annals of Math.* 34 (1933), 147–169.
- Halmos, P., *Measure Theory*, D. Van Nostrand, Princeton, 1950. Reprinted: Springer-Verlag, New York, 1974 and again 1997.

- Harish-Chandra, Faithful representations of Lie algebras, *Annals of Math.* 50 (1949), 68–76. (= *Collected Papers*, Vol. I, pp. 222–230.)
- Harish-Chandra, On some applications of the universal enveloping algebra of a semisimple Lie algebra, *Trans. Amer. Math. Soc.* 70 (1951), 28–96. (= *Collected Papers*, Vol. I, pp. 292–360.)
- Harish-Chandra, Representations of a semisimple Lie group on a Banach space I, *Trans. Amer. Math. Soc.* 75 (1953), 185–243. (= *Collected Papers*, Vol. I, pp. 391–449.)
- Harish-Chandra, Representations of semisimple Lie groups V, *Proc. Nat. Acad. Sci. USA* 40 (1954), 1076–1077. (= *Collected Papers*, Vol. I, pp. 561–563.)
- Harish-Chandra, Representations of semisimple Lie groups IV, V, VI *Amer. J. Math.* 77 (1955), 743–777; 78 (1956), 1–41; 78 (1956), 564–628. (= *Collected Papers*, Vol. II, pp. 13–154.)
- Harish-Chandra, The characters of semisimple Lie groups, *Trans. Amer. Math. Soc.* 83 (1956a), 98–163. (= *Collected Papers*, Vol. II, pp. 156–221.)
- Harish-Chandra, On a lemma of F. Bruhat, *J. de Math. Pures et Appliquées* 35 (1956b), 203–210. (= *Collected Papers*, Vol. II, pp. 223–330.)
- Harish-Chandra, Fourier transforms on a semisimple Lie algebra II, *Amer. J. Math.* 79 (1957), 653–686. (= *Collected Papers*, Vol. II, pp. 343–376.)
- Harish-Chandra, Spherical functions on a semisimple Lie group I, *Amer. J. Math.* 80 (1958), 241–310. (= *Collected Papers*, Vol. II, pp. 409–478.)
- Harish-Chandra, Invariant eigendistributions on a semisimple Lie group, *Trans. Amer. Math. Soc.* 119 (1965), 457–508. (= *Collected Papers*, Vol. III, pp. 351–402.)
- Harish-Chandra, Discrete series for semisimple Lie groups II, *Acta Math.* 116 (1966), 1–111. (= *Collected Papers*, Vol. III, pp. 537–647.)
- Harish-Chandra, Harmonic analysis on real reductive groups I, *J. Func. Anal.* 19 (1975), 104–204. (= *Collected Papers*, Vol. IV, pp. 102–202.)
- Harish-Chandra, *Collected Papers*, I, II, III, IV, Springer-Verlag, New York, 1984.
- Hausdorff, F., Die symbolische Exponentialformel in der Gruppentheorie, *Berichte über die Verhandlungen der Königlich Sächsischen Gesellschaft der Wissenschaften zu Leipzig, Mathematisch-Physische Classe* 58 (1906), 19–48.
- Hegerfeldt, G. C., Branching theorem for the symplectic groups, *J. Math. Physics* 8 (1967), 1195–1196.
- Helgason, S., *Differential Geometry and Symmetric Spaces*, Academic Press, New York, 1962.
- Helgason, S., A duality for symmetric spaces with applications to group representations, *Advances in Math.* 5 (1970), 1–154.
- Helgason, S., *Differential Geometry, Lie Groups, and Symmetric Spaces*, Academic Press, New York, 1978. Reprinted with corrections: American Mathematical Society, Providence, 2001.
- Helgason, S., *Groups and Geometric Analysis, Integral Geometry, Invariant Differential Operators, and Spherical Functions*, Academic Press, Orlando, Fla., 1984. Reprinted with corrections: American Mathematical Society, Providence, 2000.
- Helgason, S., *Geometric Analysis on Symmetric Spaces*, Mathematical Surveys and Monographs, Vol. 39, American Mathematical Society, Providence, R. I., 1994.
- Hewitt, E., and K. A. Ross, *Abstract Harmonic Analysis*, I, Springer-Verlag, Berlin, 1963. Second edition: Springer-Verlag, New York, 1979. Second edition reprinted: 1994.
- Hochschild, G., *The Structure of Lie Groups*, Holden-Day, San Francisco, 1965.

- Hochschild, G., *Introduction to Affine Algebraic Groups*, Holden-Day, San Francisco, 1971.
- Hoffman, K., and R. Kunze, *Linear Algebra*, Prentice-Hall, Englewood Cliffs, N.J., 1961. Second edition: Prentice-Hall, 1971.
- Hopf, H., Über den Rang geschlossener Liescher Gruppen, *Comment. Math. Helv.* 13 (1940–41), 119–143.
- Hopf, H., Maximale Toroiden und singuläre Elemente in geschlossenen Lieschen Gruppen, *Comment. Math. Helv.* 15 (1942–43), 59–70.
- Howe, R., Very basic Lie theory, *Amer. Math. Monthly* 90 (1983), 600–623; correction 91 (1984), 247.
- Howe, R., Perspectives on invariant theory, *The Schur Lectures (1992)*, Israel Mathematical Conference Proceedings, Vol. 8, American Mathematical Society, Providence, R.I., 1995, pp. 1–182.
- Hsiang, W.-Y., *Lectures on Lie Groups*, World Scientific, River Edge, N.J., 2000.
- Hua, L.-K., *Harmonic Analysis of Functions of Several Complex Variables in the Classical Domains*, American Mathematical Society, Providence, R.I., 1963. Revised and reprinted: 1979.
- Humphreys, J. E., *Introduction to Lie Algebras and Representation Theory*, Springer-Verlag, New York, 1972. Revised and reprinted: 1978. Revision reprinted: 1997.
- Humphreys, J. E., *Linear Algebraic Groups*, Springer-Verlag, New York, 1975. Reprinted with corrections: 1981. Revision reprinted: 1995.
- Humphreys, J. E., *Reflection Groups and Coxeter Groups*, Cambridge University Press, Cambridge, 1990.
- Hunt, G. A., A theorem of Élie Cartan, *Proc. Amer. Math. Soc.* 7 (1956), 307–308.
- Hurevitch, A., Unitary representation in Hilbert space of a compact topological group, *Recueil Mathématique (= Matematischeskii Sbornik)* 13 (55) (1943), 79–86 (English with Russian summary).
- Hurwitz, A., Ueber die Erzeugung der Invarianten durch Integration, *Nachrichten von der Königlichen Gesellschaft der Wissenschaften zu Göttingen* (1897), 71–90. (= *Mathematische Werke*, Vol. II, Emil Birkhäuser, Basel, 1933, pp. 546–564.)
- Ise, M., and M. Takeuchi, *Lie Groups, I, II*, Translations of Mathematical Monographs, Vol. 85, American Mathematical Society, Providence, R.I., 1991 (English translation of 1984 edition of first volume by both authors in Japanese and of 1978 edition of second volume by second author, the original Japanese edition of the first volume by the first author alone being dated 1977).
- Iwasawa, K., On some types of topological groups, *Annals of Math.* 50 (1949), 507–558.
- Jacobson, N., Rational methods in the theory of Lie algebras, *Annals of Math.* 36 (1935), 875–881.
- Jacobson, N., Completely reducible Lie algebras of linear transformations, *Proc. Amer. Math. Soc.* 2 (1951), 105–113.
- Jacobson, N., *Lie Algebras*, Interscience Publishers, New York, 1962.
- Kac, V. G., Some remarks on nilpotent orbits, *J. Algebra* 64 (1980), 190–213.
- Killing, W., Die Zusammensetzung der stetigen endlichen Transformationsgruppen I, II, III, IV, *Math. Annalen* 31 (1888), 252–290; 33 (1889), 1–48; 34 (1889), 57–122; 36 (1890), 161–189.
- King, R. C., Modification rules and products of irreducible representations of the unitary, orthogonal, and symplectic groups, *J. Math. Physics* 12 (1971), 1588–1598.

- King, R. C., and N. G. I. El-Sharkaway, Standard Young tableaux and weight multiplicities of the classical groups, *J. Physics A* 16 (1983), 3153–3177.
- King, R. C., and N. G. I. El-Sharkaway, Standard Young tableaux and character generators of classical Lie groups, *J. Physics A* 17 (1984), 19–45.
- Knapp, A. W., Bounded symmetric domains and holomorphic discrete series, *Symmetric Spaces*, W. M. Boothby and G. L. Weiss (ed.), Marcel Dekker, New York, 1972, 211–246.
- Knapp, A. W., Weyl group of a cuspidal parabolic, *Annales Sci. École Norm. Sup.* 8 (1975), 275–294.
- Knapp, A. W., *Representation Theory of Semisimple Groups: An Overview Based on Examples*, Princeton University Press, Princeton, 1986. Reprinted: 2001.
- Knapp, A. W., *Lie Groups, Lie Algebras, and Cohomology*, Princeton University Press, Princeton, 1988.
- Knapp, A. W., A quick proof of the classification of simple real Lie algebras, *Proc. Amer. Math. Soc.* 124 (1996), 3257–3259.
- Knapp, A. W., Branching theorems for compact symmetric spaces, *Representation Theory* 5 (2001), 404–436.
- Knapp, A. W., and D. A. Vogan, *Cohomological Induction and Unitary Representations*, Princeton University Press, Princeton, 1995.
- Knapp, A. W., and G. J. Zuckerman, Classification of irreducible tempered representations of semisimple groups, *Annals of Math.* 116 (1982), 389–501; typesetter's correction 119 (1984), 639.
- Koecher, M., An elementary approach to bounded symmetric domains, duplicated lecture notes, Rice University, Houston, 1969.
- Koike, K., and I. Terada, Young-diagrammatic methods for the representation theory of the classical groups of type B_n , C_n , D_n , *J. Algebra* 107 (1987), 466–511.
- Korányi, A., and J. A. Wolf, Realization of Hermitian symmetric spaces as generalized half-planes, *Annals of Math.* 81 (1965), 265–288.
- Kostant, B., On the conjugacy of real Cartan subalgebras I, *Proc. Nat. Acad. Sci. USA* 41 (1955), 967–970.
- Kostant, B., A formula for the multiplicity of a weight, *Trans. Amer. Math. Soc.* 93 (1959a), 53–73.
- Kostant, B., The principal three-dimensional subgroup and the Betti numbers of a complex simple Lie group, *Amer. J. Math.* 81 (1959b), 973–1032.
- Kostant, B., Lie algebra cohomology and the generalized Borel-Weil theorem, *Annals of Math.* 74 (1961), 329–387.
- Kostant, B., Verma modules and the existence of quasi-invariant differential operators, *Non-Commutative Harmonic Analysis*, Lecture Notes in Mathematics, Vol. 466, Springer-Verlag, Berlin, 1975a, pp. 101–128.
- Kostant, B., On the existence and irreducibility of certain series of representations, *Lie Groups and Their Representations: Summer School of the Bolyai János Mathematical Society*, Halsted Press, New York, 1975b, pp. 231–329.
- Kunze, R. A., and E. M. Stein, Uniformly bounded representations III, *Amer. J. Math.* 89 (1967), 385–442.
- Langlands, R. P., Problems in the theory of automorphic forms, *Lectures in Modern Analysis and Applications III*, Lecture Notes in Mathematics, Vol. 170, Springer-Verlag, Berlin, 1970, pp. 18–61.

- Langlands, R. P., On the classification of irreducible representations of real algebraic groups, mimeographed notes, Institute for Advanced Study, Princeton, 1973. Reprinted in: Sally, P. J., and D. A. Vogan (eds.), *Representation Theory and Harmonic Analysis on Semisimple Lie Groups*, Mathematical Surveys and Monographs, Vol. 31, American Mathematical Society, Providence, R.I., 1989.
- Lawson, H. B., and M.-L. Michelsohn, *Spin Geometry*, Princeton University Press, Princeton, 1989.
- Lee, C. Y., On the branching theorem of the symplectic groups, *Canad. Math. Bull.* 17 (1974), 535–545.
- Lepowsky, J. I., *Representations of Semisimple Lie Groups and an Enveloping Algebra Decomposition*, Thesis, Massachusetts Institute of Technology, 1970.
- Lepowsky, J., Multiplicity formulas for certain semisimple Lie groups, *Bull. Amer. Math. Soc.* 77 (1971), 601–605.
- Lepowsky, J., and N. R. Wallach, Finite- and infinite-dimensional representations of linear semisimple groups, *Trans. Amer. Math. Soc.* 184 (1973), 223–246.
- Levi, E. E., Sulla struttura dei gruppi finiti e continui, *Atti della Reale Accademia delle Scienze di Torino* 40 (1905), 423–437 (551–565).
- Lichtenberg, D. B., *Unitary Symmetry and Elementary Particles*, Academic Press, New York, 1970. Second edition: 1978.
- Lie, S., with the help of F. Engel, *Theorie der Transformationsgruppen*, I, II, III, B. G. Teubner, Leipzig, 1888, 1890, 1893. (Engel's role is listed as "Unter Mitwirkung von Dr. Friedrich Engel.")
- Littlemann, P., Characters of representations and paths in $\mathfrak{h}_{\mathbb{R}}^*$, *Representation Theory and Automorphic Forms*, Proceedings Symposia in Pure Mathematics, Vol. 61, American Mathematical Society, Providence, R.I., 1997, pp. 29–49.
- Littlewood, D. E., *The Theory of Group Characters and Matrix Representations of Groups*, Clarendon Press, Oxford, 1940. Second edition: 1950.
- Littlewood, D. E., and A. R. Richardson, Group characters and algebra, *Phil. Trans. Royal Soc. A* 233 (1934), 99–141.
- Loomis, L. H., *An Introduction to Abstract Harmonic Analysis*, D. Van Nostrand, New York, 1953.
- Loos, O., *Symmetric Spaces*, I, W. A. Benjamin, New York, 1969a.
- Loos, O., *Symmetric Spaces*, II, W. A. Benjamin, New York, 1969b.
- Macdonald, I. G., *Symmetric Functions and Hall Polynomials*, Clarendon Press, Oxford, 1979. Second edition: 1995.
- Mackey, G. W., *Harmonic Analysis as the Exploitation of Symmetry—A Historical Survey*, Rice University Studies, Vol. 64, Nos. 2 and 3, 1978, pp. 73–228. Reprinted in: Mackey, G. W., *The Scope and History of Commutative and Noncommutative Harmonic Analysis*, History of Mathematics, Vol. 5, American Mathematical Society, Providence, R.I., 1992.
- Malcev, A. I., On semi-simple subgroups of Lie groups, *Bulletin de l'Académie des Sciences de l'URSS, Série Mathématique* (= *Izvestiya Akademii Nauk SSSR, Seriya Matematicheskaya*) 8 (1944), 143–174 (Russian). English translation: *Amer. Math. Soc. Translation*, Vol. 33, 1950; reissued as: On semisimple subgroups of Lie groups, *Amer. Math. Soc. Translations* (1) 9 (1962), 172–213.
- Malcev, A., On the theory of Lie groups in the large, *Recueil Mathématique* (= *Matematicheskii Sbornik*) 16 (58) (1945), 163–190 (English with Russian summary).

- Maliakas, M., Representation theoretic realizations of two classical character formulas of D. E. Littlewood, *Communications in Algebra* 19 (1991), 271–296.
- Maliakas, M., The universal form of the branching rule for the symplectic groups, *J. Algebra* 168 (1994), 221–248.
- McKay, W. G., and J. Patera, *Tables of Dimensions, Indices, and Branching Rules for Representations of Simple Lie Algebras*, Marcel Dekker, New York, 1981.
- Montgomery, D., and L. Zippin, *Topological Transformation Groups*, Interscience, New York, 1955.
- Moore, C. C., Compactifications of symmetric spaces, *Amer. J. Math.* 86 (1964a), 201–218.
- Moore, C. C., Compactifications of symmetric spaces II, *Amer. J. Math.* 86 (1964b), 358–378.
- Morozov, V. V., On a nilpotent element in a semi-simple Lie algebra, *Comptes Rendus (Doklady) de l'Académie des Sciences de l'URSS* (= *Doklady Akademii Nauk SSSR*) 36 (1942a), 83–86 (English).
- Morozov, V. V., listed as W. Morosov, On the centralizer of a semi-simple subalgebra of a semi-simple Lie algebra, *Comptes Rendus (Doklady) de l'Académie des Sciences de l'URSS* (= *Doklady Akademii Nauk SSSR*) 36 (1942b), 259–261 (English).
- Mortajine, A., *Classification des Espaces Préhomogènes de Type Parabolique Réguliers et de Leurs Invariants Relatifs*, Travaux en Cours, Vol. 40, Hermann, Paris, 1991.
- Mostow, G. D., A new proof of E. Cartan's theorem on the topology of semi-simple groups, *Bull. Amer. Math. Soc.* 55 (1949), 969–980.
- Mostow, G. D., The extensibility of local Lie groups of transformations and groups on surfaces, *Annals of Math.* 52 (1950), 606–636.
- Mostow, G. D., Self-adjoint groups, *Annals of Math.* 62 (1955), 44–55.
- Murakami, S., Sur la classification des algèbres de Lie réelles et simples, *Osaka J. Math.* 2 (1965), 291–307.
- Murnaghan, F. D., *The Theory of Group Representations*, Johns Hopkins Press, Baltimore, 1938. Reprinted: Dover, New York, 1963.
- Nachbin, L., *The Haar Integral*, D. Van Nostrand, Princeton, 1965.
- Navon, A., and J. Patera, Embedding of a simple Lie group into a simple Lie group and branching rules, *J. Math. Physics* 8 (1967), 489–493.
- Nelson, E., Analytic vectors, *Annals of Math.* 70 (1959), 572–615.
- Newell, M. J., Modification rules for the orthogonal and symplectic groups, *Proc. Roy. Irish Acad. Sect. A* 54 (1951), 153–163.
- Parthasarathy, K. R., R. Ranga Rao, and V. S. Varadarajan, Representations of complex semi-simple Lie groups and Lie algebras, *Annals of Math.* 85 (1967), 383–429.
- Patera, J., and R. T. Sharp, Branching rules for representations of simple Lie algebras through Weyl group orbit reduction, *J. Physics A* 22 (1989), 2329–2340.
- Peter, F., and H. Weyl, Die Vollständigkeit der primitiven Darstellungen einer geschlossenen kontinuierlichen Gruppe, *Math. Annalen* 97 (1927), 737–755. (= Weyl, *Gesammelte Abhandlungen*, Vol. III, pp. 58–75.)
- Poincaré, H., Sur les groupes continus, *C. R. Acad. Sci. Paris* 128 (1899), 1065–1069.
- Poincaré, H., Sur les groupes continus, *Trans. Cambridge Philosophical Soc.* 18 (1900), 220–255.
- Pommerening, K., Über die unipotenten Klassen reductiver Gruppen, *J. Algebra* 49 (1977), 525–536.

- Pontrjagin, L., *Topological Groups*, Princeton University Press, Princeton, 1939. Second edition: Gordon and Breach, New York, 1966.
- Proctor, R. A., Young tableaux, Gelfand patterns, and branching rules for classical groups, *J. Algebra* 164 (1994), 299–360.
- Quesne, C., Canonical solution of the state labelling problem for $SU(n) \supset SO(n)$ and Littlewood's branching rule II, *J. Physics A* 17 (1984), 777–789.
- Richardson, R. W., Conjugacy classes in Lie algebras and algebraic groups, *Annals of Math.* 86 (1967), 1–15.
- Riesz, F., and B. Sz. Nagy, *Functional Analysis*, Frederick Ungar Publishing Co., New York, 1955.
- Robinson, G. de B., On the representations of the symmetric group, *Amer. J. Math.* 60 (1938), 745–760.
- Rossmann, W., *Lie Groups: An Introduction through Linear Groups*, Oxford University Press, Oxford, 2002.
- Rubenthaler, H., Espaces vectoriels préhomogènes, sous-groupes paraboliques et $\mathfrak{sl}_2$ - triplets, *C. R. Acad. Sci. Paris* 290 (1980), Sér. A, 127–129.
- Rubenthaler, H., Espaces préhomogènes de type parabolique, *Lectures on Harmonic Analysis on Lie groups and Related Topics (Strasbourg 1979)*, Lectures in Mathematics, vol. 14, Kinokuniya Book Store, Tokyo, 1982, pp. 189–221.
- Rubenthaler, H., *Algèbres de Lie et Espaces Préhomogènes*, Travaux en Cours, Vol. 44, Hermann, Paris, 1992.
- Sagan, B. E., *The Symmetric Group: Representations, Combinatorial Algorithms, and Symmetric Functions*, Wadsworth & Brooks/Cole, Pacific Grove, Calif., 1991. Second edition: Springer-Verlag, New York, 2001.
- Satake, I., On representations and compactifications of symmetric Riemannian spaces, *Annals of Math.* 71 (1960), 77–110.
- Sato, M., Theory of prehomogeneous vector spaces (algebraic part) – the English translation of Sato's lecture from Shintani's note. Notes by Takuro Shintani. Translated from the Japanese by Masakazu Muro, *Nagoya Math. J.* 120 (1990), 1–34.
- Sato, M., and T. Kimura, A classification of irreducible prehomogeneous vector spaces and their relative invariants, *Nagoya Math. J.* 65 (1977), 1–155.
- Sato, M., and T. Shintani, On zeta functions associated with prehomogeneous vector spaces, *Annals of Math.* 100 (1974), 131–170.
- Sattinger, D. H., and O. L. Weaver, *Lie Groups and Algebras with Applications to Physics, Geometry, and Mechanics*, Springer-Verlag, New York, 1986. Reprinted with corrections: 1993.
- Schlichtkrull, H., *Hyperfunctions and Harmonic Analysis on Symmetric Spaces*, Birkhäuser, Boston, 1984.
- Schmid, W., Die Randwerte homomorpher Funktionen auf hermitesch symmetrischen Räumen, *Invent. Math.* 9 (1969), 61–80.
- Schmid, W., On the characters of discrete series: the Hermitian symmetric case, *Invent. Math.* 30 (1975), 47–144.
- Schmid, W., Poincaré and Lie groups, *Bull. Amer. Math. Soc.* 6 (1982), 175–186.
- Schreier, O., Abstrakte kontinuierliche Gruppen, *Abhandlungen aus dem Mathematischen Seminar der Hamburgischen Universität* 4 (1926), 15–32.
- Schreier, O., Die Verwandtschaft stetiger Gruppen im grossen, *Abhandlungen aus dem Mathematischen Seminar der Hamburgischen Universität* 5 (1927), 233–244.

- Schur, F., Zur Theorie der endlichen Transformationsgruppen, *Math. Annalen* 38 (1891), 263–286.
- Schur, F., Ueber den analytischen Charakter der eine endliche kontinuierliche Transformationsgruppe darstellenden Functionen, *Math. Annalen* 41 (1893), 509–538.
- Schur, I., Neue Begründung der Theorie der Gruppencharaktere, *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften* (1905), 406–432. (= *Gesammelte Abhandlungen*, Vol. I, pp. 143–169.)
- Schur, I., Neue Anwendungen der Integralrechnung auf Probleme der Invariantentheorie, *Sitzungsberichte der Preussischen Akademie der Wissenschaften* (1924), 189–208. (= *Gesammelte Abhandlungen*, Vol. II, pp. 440–459.)
- Schur, I., *Gesammelte Abhandlungen*, I, II, III, Springer-Verlag, Berlin, 1973.
- Schützenberger, M.-P., La correspondance de Robinson, *Combinatoire et Représentation du Groupe Symétrique, Strasbourg 1976*, Lecture Notes in Mathematics, Vol. 579, Springer-Verlag, Berlin, 1977, pp. 59–113.
- Séminaire “Sophus Lie,” *Théorie des Algèbres de Lie, Topologie des Groupes de Lie, 1954–55*, École Normale Supérieure, Paris, 1955.
- Serre, J.-P., Représentations linéaires et espaces homogènes Kählériens des groupes de Lie compacts, Exposé 100, *Séminaire Bourbaki, 6^e année, 1953/54*, Inst. Henri Poincaré, Paris, 1954. Reprinted with corrections: 1965.
- Serre, J.-P., Tores maximaux des groupes de Lie compacts, Exposé 23, Séminaire “Sophus Lie,” *Théorie des Algèbres de Lie, Topologie des Groupes de Lie, 1954–55*, École Normale Supérieure, Paris, 1955.
- Serre, J.-P., *Lie Algebras and Lie Groups*, W. A. Benjamin, New York, 1965. Second edition: Lecture Notes in Mathematics, Vol. 1500, Springer-Verlag, Berlin, 1992.
- Serre, J.-P., *Algèbres de Lie Semi-Simples Complexes*, W. A. Benjamin, New York, 1966. English translation: *Complex Semisimple Lie Algebras*, Springer-Verlag, New York, 1987. English translation reprinted: 2001.
- Shimura, G., *Introduction to the Arithmetic Theory of Automorphic Functions*, Princeton University Press, Princeton, 1971.
- Shintani, T., On Dirichlet series whose coefficients are class numbers of integral binary cubic forms, *J. Math. Soc. Japan* 24 (1972), 132–188.
- Spivak, M., *A Comprehensive Introduction to Differential Geometry*, Vol. 1, Publish or Perish, Houston, TX, 1970.
- Springer, T. A., *Linear Algebraic Groups*, Birkhäuser, Boston, 1981. Second edition: 1998.
- Springer, T. A., and R. Steinberg, Conjugacy classes, *Seminar on Algebraic Groups and Related Finite Groups (The Institute for Advanced Study, Princeton, N.J., 1968/69)*, Lecture Notes in Mathematics, Vol. 131, Springer-Verlag, Berlin, 1970, pp. 167–266.
- Stanley, R. P., The character generator of $SU(n)$, *J. Math. Physics* 21 (1980), 2321–2326.
- Steinberg, R., A general Clebsch-Gordon theorem, *Bull. Amer. Math. Soc.* 67 (1961), 406–407.
- Sternberg, S., *Lectures on Differential Geometry*, Prentice-Hall, Englewood Cliffs, N.J., 1964.
- Sudbery, A., Quaternionic analysis, *Math. Proc. Cambridge Phil. Soc.* 85 (1979), 199–225.
- Sugiura, M., Conjugate classes of Cartan subalgebras in real semisimple Lie algebras, *J. Math. Soc. Japan* 11 (1959), 374–434; correction 23 (1971), 379–383.

- Sugiura, M., Representations of compact groups realized by spherical functions on symmetric spaces, *Proc. Japan Acad.* 38 (1962), 111–113.
- Thoma, M., and R. T. Sharp, Orbit-orbit branching rules for families of classical Lie algebra-subalgebra pairs, *J. Math. Physics* 37 (1996), 4750–4757.
- Thomas, G. P., *Baxter Algebras and Schur Functions*, Thesis, University of Wales, Swansea, 1974.
- Tits, J., Sur certaines classes d'espaces homogènes de groupes de Lie, *Acad. Roy. Belg. Cl. Sci. Mém. Coll.* 29 (1955), No. 3.
- Tits, J., *Liesche Gruppen und Algebren*, Mathematisches Institut, Bonn, 1965. Second edition: Springer-Verlag, Berlin, 1983. Second edition reprinted: 1999.
- Tits, J., Classification of algebraic semisimple groups, *Algebraic Groups and Discontinuous Subgroups*, Proceedings Symposia in Pure Mathematics, Vol. 9, American Mathematical Society, Providence, R.I., 1966, pp. 33–62.
- Umlauf, K. A., *Über die Zusammensetzung der enlichen continuierlichen Transformationsgruppen, insbesondere der Gruppen vom Range Null*, Thesis, Leipzig, 1891.
- van Daele, A., General formula to derive branching rules, *J. Math. Physics* 11 (1970), 3275–3282.
- van der Waerden, B. L., Die Klassifikation der einfachen Lieschen Gruppen, *Math. Zeitschrift* 37 (1933), 446–462.
- Varadarajan, V. S., *Lie Groups, Lie Algebras, and Their Representations*, Prentice-Hall, Englewood Cliffs, N.J., 1974. Reprinted: Springer-Verlag, New York, 1984.
- Varadarajan, V. S., *An Introduction to Harmonic Analysis on Semisimple Lie Groups*, Cambridge University Press, Cambridge, 1989.
- Verma, D.-N., Structure of certain induced representations of complex semisimple Lie algebras, *Bull. Amer. Math. Soc.* 74 (1968), 160–166; correction 74 (1968), 628.
- Vinberg, E. B., On the linear groups associated to periodic automorphisms of semisimple algebraic groups, *Doklady Akademii Nauk SSSR* 221 (1975a), 767–770 (Russian). English translation: *Soviet Math. Doklady* 16 (1975), 406–409.
- Vinberg, E. B., On the classification of the nilpotent elements of graded Lie algebras, *Doklady Akademii Nauk SSSR* 225 (1975b), 745–748 (Russian). English translation: *Soviet Math. Doklady* 16 (1975), 1517–1520.
- Vinberg, E. B., The Weyl group of a graded Lie algebra, *Izvestiya Akademii Nauk SSSR, Seriya Matematicheskaya* 40 (1976), 488–526, 709 (Russian). English translation: *Math. USSR Izvestija* 10 (1976), 463–495.
- Vogan, D. A., Lie algebra cohomology and a multiplicity formula of Kostant, *J. Algebra* 51 (1978), 69–75.
- Vogan, D. A., The algebraic structure of the representation of semisimple Lie groups I, *Annals of Math.* 109 (1979), 1–60.
- Vogan, D. A., *Representations of Real Reductive Lie Groups*, Birkhäuser, Boston, 1981.
- Vogan, D. A., *Unitary Representations of Reductive Lie Groups*, Princeton University Press, Princeton, 1987.
- von Neumann, J., Zur Theorie der Darstellungen kontinuierlicher Gruppen, *Sitzungsberichte der Preussischen Akademie der Wissenschaften, Physikalisch-Mathematische Klasse* (1927), 76–90. (= *Collected Works*, Vol. I, pp. 134–148.)
- von Neumann, J., Über die analytischen Eigenschaften von Gruppen linearer Transformationen und ihrer Darstellungen, *Math. Zeitschrift* 30 (1929), 3–42. (= *Collected Works*, Vol. I, pp. 509–548.)

- von Neumann, J., Die Einführung analytischer Parameter in topologischen Gruppen, *Annals of Math.* 34 (1933), 170–190. (= *Collected Works*, Vol. II, pp. 366–386.)
- von Neumann, J., Zum Haarschen Mass in topologischen Gruppen, *Compositio Math.* 1 (1934a), 106–114. (= *Collected Works*, Vol. II, pp. 445–453.)
- von Neumann, J., Almost periodic functions in a group I, *Trans. Amer. Math. Soc.* 36 (1934b), 445–492. (= *Collected Works*, Vol. II, pp. 454–501.)
- von Neumann, J., *Collected Works*, I to VI, Pergamon Press, Oxford, 1961.
- Wallach, N. R., *A Classification of Real Simple Lie Algebras*, Thesis, Washington University, 1966.
- Wallach, N. R., On maximal subsystems of root systems, *Canad. J. Math.* 20 (1968), 555–574.
- Wallach, N. R., Cyclic vectors and irreducibility for principal series representations, *Trans. Amer. Math. Soc.* 158 (1971), 107–113.
- Wallach, N. R., Cyclic vectors and irreducibility for principal series representations II, *Trans. Amer. Math. Soc.* 164 (1972), 389–396.
- Wallach, N. R., *Harmonic Analysis on Homogenous Spaces*, Marcel Dekker, New York, 1973.
- Wallach, N. R., The analytic continuation of the discrete series II, *Trans. Amer. Math. Soc.* 251 (1979), 19–37.
- Wallach, N., *Real Reductive Groups*, I, Academic Press, San Diego, 1988.
- Wallach, N., *Real Reductive Groups*, II, Academic Press, San Diego, 1992.
- Warner, F. W., *Foundations of Differentiable Manifolds and Lie Groups*, Scott Foresman, Glenview, Ill., 1971. Reprinted with corrections: Springer-Verlag, New York, 1982. Revision reprinted: 1996.
- Warner, G., *Harmonic Analysis on Semi-Simple Lie Groups*, I, Springer-Verlag, New York, 1972a.
- Warner, G., *Harmonic Analysis on Semi-Simple Lie Groups*, II, Springer-Verlag, New York, 1972b.
- Weil, A., Démonstration topologique d'un théorème fondamental de Cartan, *C. R. Acad. Sci. Paris* 200 (1935), 518–520.
- Weil, A., *L'Intégration dans les Groupes Topologiques et Ses Applications*, Actualités Scientifiques et Industrielles, Vol. 869, Hermann, Paris, 1940. Second edition: Actualités Scientifiques et Industrielles, Vol. 869–1145, 1951.
- Wells, R. O., *Differential Analysis on Complex Manifolds*, Prentice-Hall, Englewood Cliffs, N.J., 1973. Second edition: Springer-Verlag, New York, 1980. Second edition reprinted: 1991.
- Weyl, H., Zur Theorie der Darstellung der einfachen kontinuierlichen Gruppen (Aus einem Schreiben an Herrn I. Schur), *Sitzungsberichte der Preussischen Akademie der Wissenschaften* (1924), 338–345. (= *Gesammelte Abhandlungen*, Vol. II, pp. 453–460.)
- Weyl, H., Theorie der Darstellung kontinuierlicher halbeinfacher Gruppen durch lineare Transformationen I, II, III, and Nachtrag, *Math. Zeitschrift* 23 (1925), 271–309; 24 (1926), 328–376; 24 (1926), 377–395; 24 (1926), 789–791. (= *Gesammelte Abhandlungen*, Vol. II, pp. 543–645.)
- Weyl, H., *The Theory of Groups and Quantum Mechanics*, Methuen and Co., Ltd., London, 1931. Reprinted: Dover, New York, 1950.

- Weyl, H., *The Structure and Representation of Continuous Groups*, Notes by N. Jacobson, Institute for Advanced Study, Princeton, 1934.
- Weyl, H., *The Structure and Representation of Continuous Groups*, Notes by R. Brauer, Institute for Advanced Study, Princeton, 1935.
- Weyl, H., *The Classical Groups: Their Invariants and Representations*, Princeton University Press, Princeton, 1939. Second edition: 1946. Second edition reprinted: 1997.
- Weyl, H., *Gesammelte Abhandlungen*, I, II, III, IV, Springer-Verlag, Berlin, 1968.
- Whitehead, J. H. C., On the decomposition of an infinitesimal group, *Proc. Cambridge Phil. Soc.* 32 (1936), 229–237. (= *Mathematical Works*, Vol. I, Macmillan, New York, 1963, pp. 281–289.)
- Whitehead, J. H. C., Certain equations in the algebra of a semi-simple infinitesimal group, *Quart. J. Math.* 8 (1937), 220–237. (= *Mathematical Works*, Vol. I, Macmillan, New York, 1963, pp. 291–308.)
- Wigner, E. P., *Group Theory and Its Applications to the Quantum Mechanics of Atomic Spectra*, Academic Press, New York, 1959.
- Witt, E., Treue Darstellung Liescher Ringe, *J. Reine Angew. Math.* 177 (1937), 152–160.
- Witt, E., Spiegelungsgruppen und Aufzählung halbeinfacher Liescher Ringe, *Abhandlungen aus dem Mathematischen Seminar der Hansischen Universität* 14 (1941), 289–322.
- Wolf, J. A., Complex homogeneous contact manifolds and quaternionic symmetric spaces, *J. Math. and Mech.* 14 (1965), 1033–1047.
- Wolf, J. A., and A. Korányi, Generalized Cayley transformations of bounded symmetric domains, *Amer. J. Math.* 87 (1965), 899–939.
- Wybourne, B. G., Branching rules for $E_8 \downarrow SO_{16}$, *J. Physics A* 17 (1984), 1397–1402.
- Yamabe, H., On an arcwise connected subgroup of a Lie group, *Osaka J. Math.* 2 (1950), 13–14.
- Yang, C. T., Hilbert’s fifth problem and related problems on transformation groups, *Mathematical Developments Arising from Hilbert Problems*, Proceedings Symposia in Pure Mathematics, Vol. 28, Part 1, American Mathematical Society, Providence, R.I., 1976, pp. 142–146.
- Young, A., On quantitative substitutional analysis, *Proc. London Math. Soc.* (1) 33 (1901), 97–146.
- Zariski, O., and P. Samuel, *Commutative Algebra*, I, D. Van Nostrand, Princeton, 1958.
- Zariski, O., and P. Samuel, *Commutative Algebra*, II, D. Van Nostrand, Princeton, 1960.
- Zhelobenko, D. P., The classical groups. Spectral analysis of their finite-dimensional representations, *Uspehi Matematicheskikh Nauk* 17 (1962), No. 1 (103), 27–120 (Russian). English translation: *Russian Math. Surveys* 17 (1962), 1–94.
- Zhelobenko, D. P., *Compact Lie Groups and Their Representations*, Izdat. “Nauka”, Moscow, 1970 (Russian). English translation: *Translations of Mathematical Monographs*, Vol. 40, American Mathematical Society, Providence, R.I., 1973.