

A short bibliography on classical groups

Standard books on classical groups are Artin [2], Dieudonné [14], Dickson [13] and, for a more modern account, Taylor [22]. Cameron [5] describes the underlying geometry.

Books on related topics include Cohn [10] on division rings, Gorenstein [15] for the classification of finite simple groups, the *ATLAS* [11] for properties of small simple groups (including all the sporadic groups), the *Handbook of Incidence Geometry* [4] for a detailed account of many topics including the geometry of the classical groups, Chevalley [9] on Clifford algebras, spinors and triality, and Kleidman and Liebeck [17] on subgroups of classical groups. (The last book is a detailed commentary on the theorem of Aschbacher [3], itself the culmination of a line of research commencing with Galois and continuing through Cooperstein [12] and Kantor [16]. Cameron [6] has some geometric speculations on Aschbacher's Theorem.)

Carter [8] discusses groups of Lie type (identifying many of these with classical groups). The natural geometries for the groups of Lie type are buildings: see Tits [23] for the classification of spherical buildings, and Scharlau [21] for a modern account.

The other papers in the bibliography discuss aspects of the generation, subgroups, or representations of the classical groups. The list is not exhaustive!

References

- [1] E. Artin, The orders of the classical simple groups, *Comm. Pure Appl. Math.* **8** (1955), 455–472.
- [2] E. Artin, *Geometric Algebra*, Interscience, New York, 1957.
- [3] M. Aschbacher, On the maximal subgroups of the finite classical groups, *Invent. Math.* **76** (1984), 469–514.
- [4] F. Buekenhout (ed.), *Handbook of Incidence Geometry*, Elsevier, Amsterdam, 1995.
- [5] P. J. Cameron, *Projective and Polar Spaces*, QMW Maths Notes **13**, London, 1991.

- [6] P. J. Cameron, Finite geometry after Aschbacher's Theorem: $\mathrm{PGL}(n, q)$ from a Kleinian viewpoint, pp. 43–61 in *Geometry, Combinatorics and Related Topics* (ed. J. W. P. Hirschfeld et al.), London Math. Soc. Lecture Notes **245**, Cambridge University Press, Cambridge, 1997.
- [7] P. J. Cameron and W. M. Kantor, 2-transitive and antiflag transitive collineation groups of finite projective spaces, *J. Algebra* **60** (1979), 384–422.
- [8] R. W. Carter, *Simple Groups of Lie Type*, Wiley, New York, 1972.
- [9] C. Chevalley, *The Algebraic Theory of Spinors and Clifford Algebras* (Collected Works Vol. 2), Springer, Berlin, 1997.
- [10] P. M. Cohn, *Skew Field Constructions*, London Math. Soc. Lecture Notes **27**, Cambridge University Press, Cambridge, 1977.
- [11] J. H. Conway, R. T. Curtis, S. P. Norton, R. A. Parker, and R. A. Wilson, *An ATLAS of Finite Groups*, Oxford University Press, Oxford, 1985.
- [12] B. N. Cooperstein, Minimal degree for a permutation representation of a classical group, *Israel J. Math.* **30** (1978), 213–235.
- [13] L. E. Dickson, *Linear Groups, with an Exposition of the Galois Field Theory*, Dover Publ. (reprint), New York, 1958.
- [14] J. Dieudonné, *La Géometrie des Groupes Classiques*, Springer, Berlin, 1955.
- [15] D. Gorenstein, *Finite Simple Groups: An Introduction to their Classification*, Plenum Press, New York, 1982.
- [16] W. M. Kantor, Permutation representations of the finite classical groups of small degree or rank, *J. Algebra* **60** (1979), 158–168.
- [17] P. B. Kleidman and M. W. Liebeck, *The Subgroup Structure of the Finite Classical Groups*, London Math. Soc. Lecture Notes **129**, Cambridge Univ. Press, Cambridge, 1990.
- [18] M. W. Liebeck, On the orders of maximal subgroups of the finite classical groups, *Proc. London Math. Soc.* (3) **50** (1985), 426–446.

- [19] G. Malle, J. Saxl and T. Weigel, Generation of classical groups, *Geom. Dedicata* **49** (1994), 85–116.
- [20] H. Mäurer, Eine Charakterisierung der Permutationsgruppe $\mathrm{PSL}(2, K)$ über einem quadratisch abgeschlossenen Körper K der Charakteristik $\neq 2$, *Geom. Dedicata* **36** (1990), 235–237.
- [21] R. Scharlau, Buildings, pp. 477–645 in *Handbook of Incidence Geometry* (F. Buekenhout, ed.), Elsevier, Amsterdam, 1995.
- [22] D. E. Taylor, *The Geometry of the Classical Groups*, Heldermann Verlag, Berlin, 1992.
- [23] J. Tits, *Buildings of Spherical Type and Finite BN-Pairs*, Lecture Notes in Math. **382**, Springer–Verlag, Berlin, 1974.
- [24] J. A. Todd, As it might have been, *Bull. London Math. Soc.* **2** (1970), 1–4.