APPENDIX **A**

Annotated Bibliography

Apart from Hartshorne 1977, among the books listed below, I especially recommend Shafarevich 1994 — it is very easy to read, and is generally more elementary than these notes, but covers more ground (being much longer).

Commutative Algebra

Atiyah, M.F and MacDonald, I.G., Introduction to Commutative Algebra, Addison-Wesley 1969. This is the most useful short text. It extracts the essence of a good part of Bourbaki 1961–83.

Bourbaki, N., Algèbre Commutative, Chap. 1–7, Hermann, 1961–65; Chap 8–9, Masson, 1983. Very clearly written, but it is a reference book, not a text book.

Eisenbud, D., Commutative Algebra, Springer, 1995. The emphasis is on motivation.

Matsumura, H., Commutative Ring Theory, Cambridge 1986. This is the most useful medium-length text (but read Atiyah and MacDonald or Reid first).

Nagata, M., Local Rings, Wiley, 1962. Contains much important material, but it is concise to the point of being almost unreadable.

Reid, M., Undergraduate Commutative Algebra, Cambridge 1995. According to the author, it covers roughly the same material as Chapters 1–8 of Atiyah and MacDonald 1969, but is cheaper, has more pictures, and is considerably more opinionated. (However, Chapters 10 and 11 of Atiyah and MacDonald 1969 contain crucial material.)

Serre: Algèbre Locale, Multiplicités, Lecture Notes in Math. 11, Springer, 1957/58 (third edition 1975).

Zariski, O., and Samuel, P., Commutative Algebra, Vol. I 1958, Vol II 1960, van Nostrand. Very detailed and well organized.

Elementary Algebraic Geometry

Abhyankar, S., Algebraic Geometry for Scientists and Engineers, AMS, 1990. Mainly curves, from a very explicit and down-to-earth point of view.

Reid, M., Undergraduate Algebraic Geometry. A brief, elementary introduction. The final chapter contains an interesting, but idiosyncratic, account of algebraic geometry in the twentieth century.

This is an annotated bibliography for Algebraic Geometry by J.S. Milne. It was written about 2001, and won't be updated. Posted July 9, 2015

Smith, Karen E.; Kahanpää, Lauri; Kekäläinen, Pekka; Traves, William. An invitation to algebraic geometry. Universitext. Springer-Verlag, New York, 2000. An introductory overview with few proofs but many pictures.

Computational Algebraic Geometry

Cox, D., Little, J., O'Shea, D., Ideals, Varieties, and Algorithms, Springer, 1992. This gives an algorithmic approach to algebraic geometry, which makes everything very down-to-earth and computational, but the cost is that the book doesn't get very far in 500pp.

Subvarieties of Projective Space

Harris, Joe: Algebraic Geometry: A first course, Springer, 1992. The emphasis is on examples.

Musili, C. Algebraic geometry for beginners. Texts and Readings in Mathematics, 20. Hindustan Book Agency, New Delhi, 2001.

Shafarevich, I., Basic Algebraic Geometry, Book 1, Springer, 1994. Very easy to read.

Algebraic Geometry over the Complex Numbers

Griffiths, P., and Harris, J., Principles of Algebraic Geometry, Wiley, 1978. A comprehensive study of subvarieties of complex projective space using heavily analytic methods.

Mumford, D., Algebraic Geometry I: Complex Projective Varieties. The approach is mainly algebraic, but the complex topology is exploited at crucial points.

Shafarevich, I., Basic Algebraic Geometry, Book 3, Springer, 1994.

Abstract Algebraic Varieties

Dieudonné, J., Cours de Géometrie Algébrique, 2, PUF, 1974. A brief introduction to abstract algebraic varieties over algebraically closed fields.

Kempf, G., Algebraic Varieties, Cambridge, 1993. Similar approach to these notes, but is more concisely written, and includes two sections on the cohomology of coherent sheaves.

Kunz, E., Introduction to Commutative Algebra and Algebraic Geometry, Birkhäuser, 1985. Similar approach to these notes, but includes more commutative algebra and has a long chapter discussing how many equations it takes to describe an algebraic variety.

Mumford, D. Introduction to Algebraic Geometry, Harvard notes, 1966. Notes of a course. Apart from the original treatise (Grothendieck and Dieudonné 1960–67), this was the first place one could learn the new approach to algebraic geometry. The first chapter is on varieties, and last two on schemes.

Mumford, David: The Red Book of Varieties and Schemes, Lecture Notes in Math. 1358, Springer, 1999. Reprint of Mumford 1966.

Schemes

Eisenbud, D., and Harris, J., Schemes: the language of modern algebraic geometry, Wadsworth, 1992. A brief elementary introduction to scheme theory.

Grothendieck, A., and Dieudonné, J., Eléments de Géométrie Algébrique. Publ. Math. IHES 1960–1967. This was intended to cover everything in algebraic geometry in 13 massive books, that is, it was supposed to do for algebraic geometry what Euclid's "Elements" did for geometry. Unlike the earlier Elements, it was abandoned after 4 books. It is an extremely useful reference.

Hartshorne, R., Algebraic Geometry, Springer 1977. Chapters II and III give an excellent account of scheme theory and cohomology, so good in fact, that no one seems willing to write a competitor. The first chapter on varieties is very sketchy.

Iitaka, S. Algebraic Geometry: an introduction to birational geometry of algebraic varieties, Springer, 1982. Not as well-written as Hartshorne 1977, but it is more elementary, and it covers some topics that Hartshorne doesn't.

Shafarevich, I., Basic Algebraic Geometry, Book 2, Springer, 1994. A brief introduction to schemes and abstract varieties.

History

Dieudonné, J., History of Algebraic Geometry, Wadsworth, 1985.

Of Historical Interest

Hodge, W., and Pedoe, D., Methods of Algebraic Geometry, Cambridge, 1947–54.

Lang, S., Introduction to Algebraic Geometry, Interscience, 1958. An introduction to Weil 1946.

Weil, A., Foundations of Algebraic Geometry, AMS, 1946; Revised edition 1962. This is where Weil laid the foundations for his work on abelian varieties and jacobian varieties over arbitrary fields, and his proof of the analogue of the Riemann hypothesis for curves and abelian varieties. Unfortunately, not only does its language differ from the current language of algebraic geometry, but it is incompatible with it.