Title : «Introduction to algebraic geometry and number theory»

Abstract :

This course is a basic introduction to number theory and algebraic geometry, with an emphasis on their interactions. The modern language of algebraic geometry, initiated by A. Grothendieck, allows to treat these two topics in a unified way. We want to make this unity visible throughout the course, while avoiding the abuse of technicalities.

Each notion is developped from a historical perspective, starting from the motivations that lead to the actual notion.

The temptative program is the following :

1. Integral closure, rings of integers
2. Ideal class groups, Kummer, Fermat
3. Introduction to class field theory and Langlands correspondances
4. Introduction to algebraic geometry : spectrum of a ring, Zariski topology
5. Regular local rings, Dedekind domains
6. Completion, p-adic numbers
7. Algebraic curves
8. Projective curves

Requirements : Although a few notions of commutative algebra would be useful, the course aims to be self-contained.

Références

[S] Pierre Samuel, *Théorie algébrique des nombres*, Hermann, collection Méthodes, Paris, 1967 (ISBN 2-7056-5589-1).

[E-H] David Eisenbud and Joe Harris, *The Geometry of Schemes*, Springer-Verlag, New York, 2000 (ISBN 0-387-98638-3).

[M] David Mumford, *The Red Book of Varieties and Schemes*, Lecture Notes in Math. 1358, Springer, Berlin, 1988.

[L] Qing Liu, *Algebraic Geometry and Arithmetic Curves*, Oxford Graduate Texts in Mathematics, 6, Oxford University Press, 2nd edition, 2006 (ISBN 0-19-920249-4).