

Introduction to Arakelov Geometry

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The course should basically cover the following topics :

- (1) Arithmetic curves (hermitian vector bundles, successive minima and the link with transcendence problems) ;
- (2) Arakelov's intersection of admissible divisors on surfaces ;
- (3) Basic definition of intersection theory of Soule-Gillet ;
- (4) Hilbert-Samuel formula ;
- (5) Volumes of big line bundles ;
- (6) Equidistribution of small points.

Prerequisite :

Basic notion in commutative algebra (projective module, local ring, valuation theory etc) and algebraic number theory (Dedekind domain, elementary Galois theory). Some knowledge on projective algebraic geometry as ampleness will be helpful.

Below is some reference for the prerequisite :

- [1] Eisenbud, Commutative algebra with a view toward algebraic geometry, GTM 150.
- [2] Neukirch, Algebraic number theory, Grundlehren der Mathematischen Wissenschaften 322.
- [3] Lazarsfeld, Positivity in algebraic geometry, I, Ergebnisse der Mathematik und ihrer Grenzgebiete 48

Definition of schemes, line bundles and intersections on algebraic surfaces will be useful. A nice reference is Hartshorne's book chapter 2, 4, 5.

Reference for the course :

The articles by Chinburg and Silverman in the book "arithmetic geometry" by Cornell and Silverman, More references will be posted as the lectures begin.