

Riemann-Roch Theorem for Algebraic Plane Curves

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Room 1BC45

26th May 2017 - 14.00

Abstract:

The Riemann-Roch Theorem is a very well-known result in Algebraic Geometry and in Complex Analysis. In one of its algebraic formulations, it relates the dimension of the vector space of rational functions with a prescribed set of poles over a nonsingular complete curve, with the genus of the curve itself. This result is quite interesting, since it links the algebraic notion of *valuation* with the geometrical notion of *rational function* and with the topological notion of *genus*. The goal of this seminar will be to prove a preliminary result, known as the Riemann's Theorem for curves, which has some interesting consequences, and to briefly discuss a Fulton's proof of the Riemann-Roch Theorem, using the *Noether Reduction Lemma*.

References

- Fulton W., *Algebraic Curves - An Introduction to Algebraic Geometry*, 28th January 2008, download: <http://www.math.lsa.umich.edu/~wfulton/CurveBook.pdf>
- Garuti M. A., *Commutative Algebra Lecture Notes*, 17th January 2017, download: <http://www.math.unipd.it/~mgaruti/CA/50sNak.pdf>
- Hartshorne R., *Algebraic Geometry*, Springer 1977