

LTCC Advanced Course

Title: Intersection Theory

Basic Details:

- Core Audience (1styr or 2nd/3rdyr: pure, app. or stats): pure
- Course Format (Extended: 5 x 2hr lectures) 5x2hr

The aim of this course is to provide an introduction to intersection theory. The basic object of study is the Chow ring, which is an invariant of algebraic varieties (and more generally: schemes, stacks) that encodes refined geometric information. This course will cover the construction of Chow rings, provide some illustrative examples and touch upon some of the many conjectures concerning the structure of Chow rings e.g. the Hodge Conjecture.

Course description:

Intersection theory concerns the study of algebraic cycles on algebraic varieties. It plays an important role in modern algebraic geometry and is central in the theory of motives.

The first part of the course will introduce the Chow ring, an invariant of algebraic varieties that houses their algebraic cycles. We will discuss the basic properties of Chow rings and study some examples.

In the second part of the course we will discuss conjectures regarding the shape of the Chow ring and its relation to other invariants such as cohomology. The latter connection is the subject of the famous Hodge Conjecture.

Course requirements:

The course will use the language of schemes as in Hartshorne 'Algebraic Geometry' Chapters 2-3.

References:

The course will mostly use: Fulton 'Intersection Theory', Springer-Verlag 1998 (2nd edition). See also the useful and concise Appendix A in Hartshorne 'Algebraic Geometry', Springer-Verlag 1977.

Lecturer Details:

- Lecturer: Dr Simon Cooper
- Lecturer home institution: Kings College London
- Lecturer e-mail: simon.cooper@kcl.ac.uk