

Characteristic Classes

Trinity Term 2013

Christopher Douglas
Email: cdouglas@maths

Course Time: T10-12
Office: SGS7

Course Location: TCC
Website: ~/teaching/classes/cc/

Course Outline

- Tues. 23 Apr 1. Vector bundles.
Tues. 23 Apr 2. Classifying spaces.
- Tues. 30 Apr 1. Crash course: Serre spectral sequences.
Tues. 30 Apr 2. Crash course: Eilenberg-Moore spectral sequences.
- Tues. 7 May 1. Cohomology of real Grassmannians, mod 2.
Tues. 7 May 2. Stiefel-Whitney classes as obstructions.
- Tues. 14 May 1. Stiefel-Whitney calculations and applications.
Tues. 14 May 2. Complex Grassmannians and Chern classes.
- Tues. 21 May 1. Cohomology of real Grassmannians, low rank.
Tues. 21 May 2. Cohomology of real Grassmannians, adjoin $\frac{1}{2}$.
- Tues. 28 May 1. Euler classes.
Tues. 28 May 2. Pontryagin classes.
- Tues. 4 June 1. Characteristic classes as symmetric polynomials.
Tues. 4 June 2. Pontryagin classes of a complex bundle.
- Tues. 11 June 1. Integral cohomology groups of real Grassmannians.
Tues. 11 June 2. Integral cohomology rings of real Grassmannians.

References

Milnor & Stasheff, *Characteristic classes*.
Hatcher, *Algebraic topology*, chapter 4.
Hatcher, *Spectral sequences in algebraic topology*.
Hatcher, *Vector bundles and K-theory*.
McCleary, *A user's guide to spectral sequences*.
Weibel, *An introduction to homological algebra*.

Prerequisites

The course is aimed at students who have had a first graduate course in algebraic topology, covering, for instance, chapters 2 and 3 of Hatcher.