Mapping class groups (M16)

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Let S be a compact, smooth, orientable surface. The group of orientation-preserving self-diffeomorphisms of S, $\mathrm{Diff}^+(S)$, is too large to conveniently study, so we instead pass to the quotient

$$\mathrm{Mod}(S) = \mathrm{Diff}^+(S)/\mathrm{Diff}_0(S)$$

by factoring out the path component of the identity element. The resulting group – the *mapping class group* of S – is both tractable to study, and encodes a great deal of information about the topology and geometry of S. Mapping class groups are ubiquitous, appearing in subjects as diverse as algebraic geometry, combinatorial group theory, symplectic geometry, dynamics and 3-manifold topology. The goal of this course is to introduce the tools that are used to study them, and to prove some fundamental results.

Pre-requisites

Part II Algebraic Topology is essential. Part II Riemann Surfaces is useful. Part III Algebraic Topology, taken concurrently, is useful.

Literature

1. B. Farb and D. Margalit *A primer on mapping class groups.* Princeton Mathematical Series, 49. Princeton University Press, Princeton, NJ, 2012. xiv+472 pp.

Additional support

Three examples sheets will be provided and three associated examples classes will be given. There will be a one-hour revision class in the Easter Term.