

Calculating the stable homology of families of configuration spaces and other moduli spaces, III

Martin Palmer-Anghel // Talk at the GeMAT seminar, IMAR, 31 May 2019

Abstract.

The two previous talks (1,2) in this series focused on identifying the “stable homology” of *unordered* and *oriented configuration spaces* on a manifold.

In this talk I will outline the main ideas involved in identifying the stable (co)homology of the *mapping class groups* of compact, connected, orientable surfaces (with rational coefficients, this is the same as the stable (co)homology of the *moduli spaces of Riemann surfaces*). This is the *Madsen-Weiss theorem* [MW], although I will follow the outline of a later (and shorter) proof due to S. Galatius and O. Randal-Williams [GRW].

I will first recall the relationships between moduli spaces of Riemann surfaces (complex curves), mapping class groups, diffeomorphism groups of surfaces and moduli spaces of embedded, oriented subsurfaces of Euclidean space. Then I will sketch the main ideas of the proof of [GRW], which uses the latter viewpoint, considering these moduli spaces as morphism spaces in certain topological cobordism categories.

References.

- [GRW] S. Galatius, O. Randal-Williams, *Monoids of moduli spaces of manifolds*, Geometry & Topology vol. 14 pp. 1243–1302 (2010).
- [MW] I. Madsen, M. Weiss, *The stable moduli space of Riemann surfaces: Mumford’s conjecture*, Ann. of Math. vol. 165 pp. 843–941 (2007).

The overall abstract for the series of talks is [here](#).

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