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Moduli Spaces of Manifolds with Configurations

Understanding moduli spaces of manifolds has been closely related to understanding (invertible) topological field theories, through the classifying space of the cobordism category. Inspired by generalized categories of cobordisms where manifolds can have punctures or singularities, and by factorization homology, we look at a generalized moduli space construction. These can be modelled as moduli of configuration spaces on manifolds. We show that, in many cases, they exhibit homological stability and explicitly compute its stable cohomology. On the one hand this gives explicit candidates for classifying spaces of generalized cobordism categories, and on the other, this gives Diff-equivariant homological stability for configuration spaces and factorization homology.

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