

Ezra Getzler (Northwestern Univ.) Teichmueller space and topological field theory in two dimensions

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A topological field theory in d dimensions associates to each (d-1)-dimensional closed manifold M an inner-product space V(M), and to each d-dimensional manifold W with boundary M a vector v(W) in V(M), satisfying certain natural axioms; for example, V(-) takes disjoint unions to tensor products, and behaves well under diffeomorphisms. There are many flavours of topological field theories - one may for example assume that all of the manifolds are oriented, or spin, or carry a free action of a finite group G. It turns out that the two-dimensional case is especially simple: two-dimensional topological field theories are equivalent to commutative algebras with inner product (also known as commutative Frobenius algebras). In this talk, we relate this to a result in topology. Harvey has introduced a manifold with boundary containing the (6q-6)-dimensional Teichmueller space of genus g closed Riemann surfaces as its interior, and we define a filtration F(i) of this space such that the inclusion of F(i) into F(i+1) is i-connected. (The proof is an application of a triangulation of Teichmueller space constructed by Harer.) This result and its generalizations explain many pheonomena in topological field theory, including theorems of Moore and Seiberg, Moore and Segal, and Turaev.

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