

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

ZEIT:

11.12.2008, 14:00 Uhr

ORT:

HU Berlin

Institut für Mathematik

Rudower Chaussee 25, Raum 3.006 (Haus 3, Erdgeschoss)

Berlin-Adlershof

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 $(6g-6)$ -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 phenomena in topological field theory, including theorems of Moore and Seiberg, Moore and Segal, and Turaev.

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