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

TIME:
11 Dec 2008, 14:00

LOCATION:
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 pheonomena in topological field theory, including theorems of Moore and Seiberg, Moore and Segal, and Turaev.

Contact:
Humboldt-Universität zu Berlin . Institut für Mathematik
SFB 647 . Unter den Linden 6 . 10099 Berlin
Tel. +49 30 2093 1804 . Fax. +49 30 2093 2727
sfb647@math.hu-berlin.de