The Oliver Club

www.math.cornell.edu/~oliver/

Unitary TQFTs and the Topological Cauchy-Schwarz Inequality

Fix a topological surface S, and let V be the complex vector space spanned by all (compact, orientable) 3-manifolds which bound S. There is a Hermitian pairing on V, with values in the complex vector space spanned by all closed 3-manifolds. The main result is that this pairing is nondegenerate: if $< v, v > = 0$ then $v = 0$.

The proof involves the construction of a suitable complexity function c on all closed 3-manifolds so that if A and B are two 3-manifolds which bound S, there is an inequality

$$c(AB) \leq \max(c(AA), c(BB))$$

with equality if and only if $A = B$. We discuss some details of the construction of the function c, which involves input ranging from finite group TQFT's to Perelman's recent proof of the geometrization conjecture. This is joint work with Mike Freedman and Kevin Walker.

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Refreshments will be served at 3:55 PM in the Mathematics Department lounge (532 Malott Hall).

Thursday, February 7, 2008
at 4:25 PM in 406 Malott Hall