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On the extension of a TCFT to the boundary of the moduli space.

There is a construction – due to Costello, and following ideas of Witten – of a closed differential form on the moduli space of Riemann surfaces, which takes a compact Riemannian manifold as its initial input.

Integrating this differential form over the moduli space is supposed to yield the perturbative expansion of a Chern-Simons type gauge theory. However, this differential form blows up at the boundary. In this talk, I will consider a toy model in which these singularities are absent, and discuss how to extend this form to a compactification of the moduli space in this case. I hope to have time to describe a simple example. (Received September 08, 2010)