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A Chern-Simons action for noncommutative spaces

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Witten constructed a topological quantum field theory with the Chern-Simons action as Lagrangian. We define a proper noncommutative generalization of the Chern-Simons action. "Proper", in this context, means an action which is gauge invariant and concurs with the classical action if we return from noncommutative geometry to ordinary differential geometry. In contrast to the classical case, in noncommutative geometry the Chern-Simons action contains a linear term which shifts the critical points of the action, i. e. the solutions of the corresponding variational problem.

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