Stable maps to a loop group

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Abstract

Let X be a compact complex manifold, ΩK the space of based loops on a compact Lie group. Atiyah pointed out that the space of based holomorphic maps $\phi : X \to \Omega K$ is finite-dimensional. When X is a curve (say the projective line) this suggests the possibility of compactifying the space and evaluating Gromov-Witten invariants of the loop group. We explain how to do this. Surprisingly, the moduli space is not smooth, but it can be canonically deformed to a smooth space. We will outline a few simple applications, proving, for example, the associativity of the quantum cohomology.