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Supersymmetric gauge theories and nilpotent orbits

Abstract: Abstract: By studying the physical properties of supersymmetric gauge theories, one can naturally attach a certain holomorphic integrable system to a pair (G,V) where G is a semisimple group over C and V is its representation. The attached holomorphic integrable system is often given by a Hitchin system on a Riemann surface with singularities controlled by nilpotent orbits of G. This physical construction gives rise to a number of mathematical conjectures, which will be presented in detail.