Gauge Theory & Topology Seminar

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The Seiberg-Witten Equations on Manifolds with Boundary

The analysis of the Seiberg-Witten equations have led to many important results in low-dimensional topology. These include the invariants defined by Witten for 4-manifolds and the monopole Floer invariants for 3-manifolds defined by Kronheimer-Mrowka and others. In both these situations, the equations and their moduli space of solutions are studied on closed manifolds. In this talk, we study the analysis of the Seiberg-Witten equations on manifolds with boundary. First, we discuss the space of solutions to the Seiberg-Witten equations on 3-manifolds with boundary. This solution space is infinite dimensional (even modulo gauge) since no boundary conditions are imposed on the equations. Second, we discuss how this solution space yields natural boundary conditions for the Seiberg-Witten equations on a cylindrical 4-manifold R x Y, where Y is a 3-manifold with boundary. We explain how the resulting nonlinear boundary value problem has well-posedness and compactness properties, and how these results therefore serve as foundational analysis for an eventual construction of a monopole Floer theory on manifolds with boundary.

Date: Friday, November 5
Time: 3:30-4:30
Location: Harvard Mathematics Department, Science Center 507