

Meeting: 1000, Albuquerque, New Mexico, SS 5A, Special Session on Categories and Operads in Topology, Geometry, Physics and Other Applications

1000-57-42 **H A Dye*** (Heather.Dye@usma.edu), MADN-MATH, United States Military Academy, 646 Swift Road, West Point, NY 10996, and **Louis H Kauffman**. *Virtual Links and the Generalized Witten-Reshetikhin-Turaev Invariant*.

We recall virtual knot theory, a generalization of classical knot theory first introduced by Louis H. Kauffman in 1996. We define a Kirby calculus for virtual link diagrams. We then recall the Witten-Reshetikhin-Turaev(WRT) invariant of classical link diagrams. This invariant is a weighted sum of colored Jones polynomials, and is invariant under the framed Reidemeister moves and the Kirby calculus. We define a generalized WRT invariant using colored Jones polynomials for virtual links. These generalized colored Jones polynomials are invariant under the framed Reidemeister moves and the virtual Reidemeister moves. From this we construct a generalized WRT invariant that is unchanged by the framed Reidemeister and the virtual Reidemeister moves. This WRT invariant for virtual links is then shown to be invariant under the moves of the virtual Kirby calculus. We give examples of calculations of the WRT invariant for virtual links. These examples are virtual knots whose WRT invariant is non-trivial, while the analogue of the fundamental group of the corresponding "virtual three-manifold" is trivial. These examples show that the Poincare conjecture is false in this virtual domain, and raise the question of the meaning of a topological interpretation for virtual three-manifolds. (Received August 04, 2004)