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SU(N) Casson-Lin invariants for links in S^3

In 1992, X.-S. Lin introduced a Casson-type invariant $h(K)$ of knots $K \subset S^3$ via a signed count of conjugacy classes of irreducible $SU(2)$ representations of the knot group $\pi_1(S^3 - K)$ where all meridians of K are represented by trace-free $SU(2)$ matrices. Lin showed that $h(K)$ equals one-half the knot signature of K. With N. Saveliev, we defined an invariant of 2-component links $L \subset S^3$ using a construction analogous to Lin's. The invariant $h(L)$ is a signed count of conjugacy classes of certain projective $SU(2)$ representations of the link group $\pi_1(S^3 - L)$. We showed that $h(L)$ equals the linking number. In a recent joint work with H. U. Boden, we introduce invariants for n-component links L in S^3 where $n \geq 2$. The invariants are denoted $h_{N,a}(L)$ where $a = (a_1, \ldots, a_n)$ is an n-tuple of integers and each a_i labels the i-th component of the link. They are defined as a signed count of conjugacy classes of certain projective $SU(N)$ representations of $\pi_1(S^3 - L)$. In this talk, we will outline their construction, give a vanishing result for split links, and discuss some preliminary computations.