

ABSTRACT

This thesis presents a construction of a variant of the Khovanov homology for periodic links, i.e, links with certain kind of symmetry. This version takes into account symmetries of links. We use elements of homological algebra, like derived functors and spectral sequences, and integral representation theory of finite cyclic groups to construct and describe properties of the equivariant Khovanov homology. Further, we develop a spectral sequence for computing the equivariant Khovanov homology. We use this spectral sequence to compute the rational equivariant Khovanov homology of torus links $T(n, 2)$.

Apart from that, we also study properties of the equivariant analogues of the Jones polynomial. We show that they satisfy certain version of the skein relation and use it to generalize a result of J.H. Przytycki, which is a criterion for periodicity of a link in terms of its Jones polynomial. Additionally, we develop a state sum formula for the equivariant analogues of the Jones polynomial, which enables us to reprove the classical congruence of K. Murasugi.

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