

The Alexander biquandles for oriented surface links

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Abstract. A biquandle is an algebraic structure consisting of a set with four binary operations satisfying axioms derived from the oriented Reidemeister moves, where generators of the algebra are identified with semi-arcs in an oriented link diagram. This relationship between the biquandle axioms and the Reidemeister moves makes biquandles a natural source of (virtual) knot and link invariants. The Alexander biquandle is an example of a biquandle that gives rise to the generalized Alexander polynomial for oriented virtual knots and links. In this talk, we will discuss a construction of the Alexander biquandle for oriented surface links via marked graph diagrams. We will show that the elementary ideals for a presentation matrix for the biquandle are invariants for the oriented surface link. To do this we first give a minimal generating set of Yoshikawa's moves and then investigate the behavior of presentation matrices under Yoshikawa's moves. We also compute the invariants for oriented surface links represented by marked graph diagrams with triangle-type and square-type ch-graphs. This is a joint work with Y. Joung and S. Y. Lee.