Obstructions for Yoshikawa's moves on marked graph diagrams for surface links

Yewon Joung

Pusan National University

Abstract. A surface link is a closed, possibly orientable or nonorientable, surface F smoothly embedded in the oriented 4-space $\mathbf{R}^4$ or $\mathbf{S}^4$. If F is a connected surface, then it is called a surface knot. If F is oriented, then we call it an oriented surface link. A surface link can be represented by a marked graph diagram, that is, a knotted regular 4-valence rigid vertex graph diagram in which each 4-valence vertex has a marker. Two marked graph diagrams represent the same surface link if and only if they are transformed into each other by a finite sequence of Yoshikawa's moves. In this talk, we will discuss some obstructions for Yoshikawa's moves derived from a polynomial defined by a state model analogous to the Kauffman's state model for the Jones polynomial of classical knots and links, and calculated by using a skein relation based on marked graph diagrams. We also discuss some applications of these obstructions. This is a joint work with J. Kim and S. Y. Lee.