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Graphical Bracket and Jones Polynomials for Knots and Links in Thickened Surfaces

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ABSTRACT

If one examines the proof of the invariance of the bracket polynomial using oriented knot and link diagrams it becomes apparent that much of the local oriented structure can be preserved in the state summation. A closer look reveals that none of this extra structure contributes to the evaluation of link diagrams that are drawn in the plane or on the surface of the two-sphere. However, if these diagrams originate on a higher genus surface, then there is indeed much extra information in the original bracket state sum model. We exploit this extra information in this talk to formulate new invariants of knots and links in thickened surfaces and new invariants of virtual knots and links. (A virtual knot is an equivalence class of knots in thickened (orientable) surfaces taken up to handle stabilization and surface homeomorphism. This talk will construct these invariants and discuss their relationship with classical and virtual knot theory. We will discuss joint work with Heather Dye and Vassily Manturov on the categorification of these invariants.