

1163-57-424

**Hans U Boden, Micah Chrisman\*** (chrisman.76@osu.edu) and **Homayun Karimi**. *The Gordon-Litherland pairing for knots in thickened surfaces.*

The Gordon-Litherland pairing of knots in  $S^3$  is a symmetric bilinear form that unifies the quadratic forms of Trotter and Goeritz. The Gordon-Litherland pairing was extended to knots in  $\mathbb{Z}_2$ -homology 3-spheres by Greene. Here we extend the Gordon-Litherland pairing to knots in thickened surfaces  $\Sigma \times I$ , where  $\Sigma$  is closed and oriented. Our extended pairing is defined for all  $\mathbb{Z}_2$ -homologically trivial knots in  $\Sigma \times I$ . The resulting signature invariants depend only on the  $S^*$ -equivalence class of the (unoriented) spanning surface  $F$ . Previously, Im-Lee-Lee defined signature invariants for checkerboard colorable knots in thickened surfaces using Goeritz matrices. For  $\mathbb{Z}$ -homologically trivial knots in  $\Sigma \times I$ , signature invariants were defined by Boden-Chrisman-Gaudreau via a modification of the Seifert pairing. Our Gordon-Litherland pairing likewise unifies both these signature invariants for knots in  $\Sigma \times I$ . We show that the extended Gordon-Litherland pairing can be realized as a relative intersection form of a twofold branched cover of  $F$  pushed into a thickened 3-manifold  $W \times I$ , where  $\partial W = \Sigma$ . Geometric applications of these results to virtual knots are discussed. (Received September 06, 2020)