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The Gordon-Litherland pairing for virtual links

This talk is a report on joint projects with M. Chrisman and H. Karimi. The Gordon-Litherland form is a symmetric bilinear pairing on $H_1(F)$, where F is a virtual spanning surface for a virtual link. Using the Gordon-Litherland pairing and a correction term, one can define signature invariants for virtual links. The invariants defined this way are related to signatures of almost classical links previously defined in terms of the Seifert pairing in the case F is oriented, and they are also related to the checkerboard signatures defined in terms of Goeritz matrices by Im, Lee, and Lee. We will discuss applications of these invariants to virtual knot concordance and report on a program for generalizing a result of J. Greene to the virtual setting. Greene's theorem provides a geometric characterization of alternating links in terms of the definite spanning surfaces that they bound.