Writhe-like Invariants of Alternating Links

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Abstract

The writhe is a quantity calculated from crossing signs of a link diagram. It is known that the writhe calculated from any reduced alternating link diagram of the same alternating link has the same value. That is, it is a link invariant if we restrict ourselves to reduced alternating link diagrams. This is due the fact that reduced alternating link diagrams of the same link are obtainable from each other via flypes and flypes do not change writhe. This dissertation introduces new invariants for the class of reduced alternating links. It also analyzes the strength of these invariants, called writhe-like invariants, in comparison to a few general link invariants. It examines how these quantities can be used in solving other knot theory problems. A part of the dissertation is dedicated to describing the computer program that computes a few writhe-like invariants and reports on the computed data of alternating knots up diagrams to 12 crossings.