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Alexander Quandle Identification. Preliminary report.

The main goal of knot theory is determine whether certain knots are topologically equal or different. In the 1930s, Kurt Reidemeister proved that there are three moves that can be done to knots without changing the knot structure. These three Reidemeister moves from knot theory can be distilled into the three algebraic axioms of quandles. For the purpose of computing knot invariants using quandles, it is useful to compute isomorphism classes of finite quandles, particularly those of finite connected quandles. We classify isomorphism classes of Alexander quandles of order 16 and identify the connected quandles. In addition, we describe an algorithm for determining whether a finite quandle is isomorphic to an Alexander quandle and, if it is, the algorithm classifies all Alexander presentations of the quandle. We give an implementation of this algorithm in Maple code. (This research was carried out at UC Riverside.) (Received August 30, 2005)