CRITICAL POINTS OF KNOT ENERGIES

ALEXANDRA GILSBACH

In geometric knot theory we use energy functionals to examine knotted, embedded curves in 3-dimensional space. These so-called knot energies assign a value to a knot by measuring the entangledness, furthermore, self-intersections lead to infinite energy. We focus on the integral Menger curvature and evaluate its energy landscape within a knot class. Using a modified version of Palais' symmetric criticality principle, we show the existence of at least two distinct critical points in torus knot classes. To gain information about the nature of these critical points, we conduct numerical experiments. We apply a numerical gradient flow to approximate energy values and shape of the symmetric critical points and the minimiser in the whole knot class. The experiments suggest that the newly found critical points are in general not stable.