

THE BRAID INDEX OF REDUCED ALTERNATING BRAIDS

Pengyu Liu, Yuanan Diao and Gábor Hetyei

Preprint no. 2016-06

Abstract

It is well known that any link can be represented by the closure of a braid. The minimum number of strands needed in a braid whose closure represents a given link is called the braid index of the link. One of the authors had conjectured that if a link has a reduced alternating diagram which is also the closure of a braid on n strands, then the braid index of the link is exactly n . In this paper we prove that this conjecture holds in general indeed. The proof relies on the special formulas of the HOMFLY polynomial for link diagrams in closed braid forms as well as the Morton-Frank-Williams inequality. We show that one of our formulas is equivalent to the expansion derived by F. Jaeger, and our approach provides a combinatorial and shorter proof of his result.

2010 AMS Subject Classification: Primary: 57M25; Secondary: 57M27