UNIVERSITY OF PUERTO RICO RÍO PIEDRAS CAMPUS

Abstract

Faculty of Natural Sciences

Department of Mathematics

Master of Science in Pure Mathematics

On an infinite family of satellite knots and its knot polynomials

by Mónica M. Robles Fontán

Knot theory has been recurring as an area of mathematical research since the 19th century but its popularity has grown and continues to grow since the 1980's. Being the classification of knots the main aim of knot theory, we use knot polynomials to classify an infinite family of satellite knots built using trivial knots in S^3 as pattern knots and nontrivial companion knots, C. In particular, we show that any satellite knot in the infinite family will have Alexander Polynomial $\Delta(t) = \Delta_C(t^{|r|+1})$, where $|r| + 1$ is the number of Seifert surfaces obtained in the Seifert algorithm for the pattern knot and C is the companion knot. Furthermore, we give an expression for the Kauffman Bracket and the writhe of the satellite knots in study which will lead us to an expression of the Jones Polynomial. Ultimately, we prove that the pairs $\{Sat(M(r), C), Sat(M(-r), C)\}_{r=1}^{\infty}$ are different knots for the same companion knot C.