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A factorization of the Conway polynomial and covering linkage invariants. (English)

Zbl 1119.57005
J. Knot Theory Ramifications 16, No. 5, 631-640 (2007).

The article deals with the Conway polynomial of a link in the 3-sphere. *J. P. Levine* [Comment. Math. Helv. 74, 27–52 (1999; Zbl 0918.57001)] proved that the Conway polynomial of a link L is the product of two factors: one is the Conway polynomial of a knot K_L, obtained by banding together the components of L, and the other one is a power series depending on the choice of the bands and could be expressed in terms of the $\bar{\mu}$-invariant of the string link representation of L associated to the chosen bands. In this paper the authors give another description of this last factor by viewing the choice of the bands as a choice of a Seifert surface for L. More precisely, this factor is obtained as the determinant of a matrix whose entries are linking parings in the infinite cyclic covering space of the complement of K_L and which takes values in the quotient field of $\mathbb{Z}[t, t^{-1}]$. Moreover they describe the Taylor expansion of the linking pairing around $t = 1$ in terms of the derivation of links introduced by *T. D. Cochran* [Comment. Math. Helv. 60, 291–311 (1985; Zbl 0574.57008)] and give an algebraic method in order to compute it. Finally, they prove that the first non-vanishing coefficient of the Conway polynomial is determined by the linking numbers, generalizing a result of *J. Hoste* [Proc. Am. Math. Soc. 95, 299–302 (1985; Zbl 0576.57005)].

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MSC:

57M27 Invariants of knots and 3-manifolds (MSC2010)
57M25 Knots and links in the 3-sphere (MSC2010)

Keywords:

knots; links; Conway polynomial; linking numbers; covering linkage invariants; derivation on links

Full Text: DOI arXiv

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