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Transverse link invariants from the deformations of Khovanov $\mathfrak{sl}_3$-homology.  
(English)

[Zbl 1469.57014]


Deformations of Khovanov-Rozansky $\mathfrak{sl}_N$-homology were constructed in [M. Mackaay and P. Vaz, Algebr. Geom. Topol. 7, 1135–1169 (2007; Zbl 1170.57011); D. E. V. Rose and P. Wedrich, Geom. Topol. 20, No. 6, 3431–3517 (2016; Zbl 1420.57044)]. These deformed $\mathfrak{sl}_N$-homology theories are parametrized by monic polynomials of degree $N$. The goal of the paper under review is to construct an invariant of transverse links valued in deformed Khovanov-Rozansky $\mathfrak{sl}_3$-homology.

Additionally, the author studies the question of vanishing of the deformed $\mathfrak{sl}_3$-invariant. The answer to this question is expressed in terms of multiplicity of the roots of the polynomial corresponding to the deformation and in terms of vanishing of Plamenevskaya’s invariant and Wu’s invariant. Moreover, if the transverse invariant is nontrivial, the author obtains certain Bennequin-type inequalities which relate the self-linking number with concordance invariants of Lewark-Lobb, see [L. Lewark and A. Lobb, Proc. Lond. Math. Soc. (3) 112, No. 1, 81–114 (2016; Zbl 1419.57017); A. Lobb, Algebr. Geom. Topol. 12, No. 1, 293–305 (2012; Zbl 1244.57018); H. Wu, Adv. Math. 221, No. 1, 54–139 (2009; Zbl 1167.57007)].

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MSC:

57K18 Homology theories in knot theory (Khovanov, Heegaard-Floer, etc.)
57K33 Contact structures in 3 dimensions

Keywords:

Plamenevskaya invariant; Khovanov $\mathfrak{sl}_3$-homology; transverse invariants in $S^3$

Full Text: DOI