CIRCLE-VALUED MORSE THEORY, NOVIKOV HOMOLOGY, AND TWISTED ALEXANDER POLYNOMIALS

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Let K be a knot in S^3. Define the *Morse-Novikov number* $\mathcal{MN}(K)$ of K to be the minimal possible number of critical points of a Morse function $f : S^3 \setminus K \to S^1$, such that f has the standard behaviour in a neighbourhood of the knot K. The knot is fibered if and only if its Morse-Novikov number is equal to zero.

When the knot is not fibered, the Morse-Novikov theory provides lower bounds for the number $\mathcal{MN}(K)$ in terms of *the Novikov homology* of the complement of the knot. These bounds were studied by C.Weber, Lee Rudolph and the author. In the recent joint work with H.Goda we suggested a refined version of the Novikov homology which leads to a further improvement of the lower bounds for the Morse-Novikov numbers; the computations here use K.Kodama's software.

In the talk I shall discuss these results and also the relation of fibering obstructions for knots and twisted Alexander polynomials, due to H.Goda, T.Kitano, and T.Morifuji.