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Differential algebra of Legendrian links. (English) Zbl 1029.57011
Invent. Math. 150, No. 3, 441-483 (2002).

A Legendrian link in Euclidean space \mathbb{R}^3 is a link on which the restriction of the standard contact form on \mathbb{R}^3 vanishes. The three classical invariants of Legendrian isotopy classes of oriented Legendrian links (i.e., isotopies through Legendrian links) are the ordinary smooth isotopy type of the link (forgetting about the Legendrian structures), Maslov numbers and the Thurston-Bennequin number. In the present paper, a theory of differential graded algebras associated to Legendrian links is developed which are invariants of such links. They permit to show the existence of Legendrian knots which have the same classical invariants but are not Legendrian isotopic. The generators of these algebras are the crossings of the projection of the link, the differential is defined combinatorially in terms of the diagram (a more general Morse-theoretic construction associates to every generic Legendrian submanifold of a contact manifold a differential graded algebra whose generators are trajectories of the Reeb flow starting and ending at the submanifold).

Reviewer: Bruno Zimmermann (Trieste)

MSC:

57M27 Invariants of knots and 3-manifolds (MSC2010)
57R17 Symplectic and contact topology in high or arbitrary dimension
53D35 Global theory of symplectic and contact manifolds

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Keywords:

Legendrian link; Legendrian isotopy; differential graded algebras; invariants

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