

Symplectic Geometry Seminar

Monday, May 19, 4pm

Room 383N

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Cylindrical contact homology of dynamically convex contact forms in three dimensions

Abstract

I will discuss some joint work with Jo Nelson on the foundations of cylindrical contact homology of dynamically convex contact forms in three dimensions. Index calculations show that there is no problem in defining the differential by counting J -holomorphic cylinders for generic J . In the proof that $d^2 = 0$, a potential difficulty arises from possible degenerations involving branched covers of trivial cylinders, but intersection theory can be used to rule out the relevant degeneration. The proof of invariance has much worse difficulties. We resolve these using S^1 -dependent almost complex structures similarly to work of Bourgeois-Oancea. We also need to use obstruction bundle gluing to deal with certain degenerations involving branched covers of trivial cylinders. The proof of invariance in fact shows that cylindrical contact homology of dynamically convex contact forms lifts to an invariant with integer coefficients, which can be described directly in terms of J -holomorphic curves for a generic (S^1 -independent) J , with one exotic term.