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Compactness and non-compactness for generalized pseudoholomorphic curves

The study of pseudoholomorphic curves in symplectizations of contact manifolds has given many new results in the study of Reeb dynamics, over the course of the last 15 years. A large number of remarkable results in 3-manifolds come from studying foliations of the symplectization by pseudoholomorphic punctured spheres (for instance, Hofer, Wysocki and Zehnder proved that for a Baire set of contact forms, tight S^3 has either two or infinitely many periodic orbits). For index and intersection reasons, it is useful to consider a more general class of curves, if the genus is positive. These generalized pseudoholomorphic curves satisfy a Cauchy–Riemann type equation twisted by a harmonic one form. While the local theory remains the same as for standard pseudoholomorphic curves, the Gromov-type compactness results no longer hold.

This talk will present joint work with Abbas and Hofer on understanding the compactness properties of these curves, and will give examples of ways in which these curves behave quite differently from standard pseudoholomorphic curves.