

The first nine ECH “systoles” for the Hirzebruch domain.

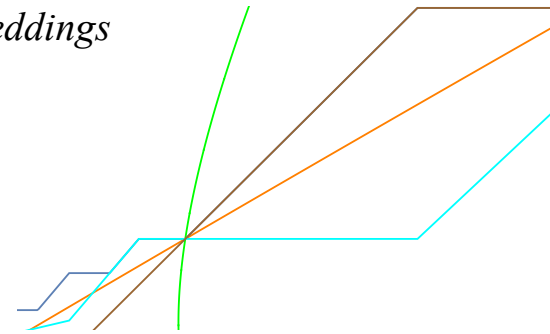
I compute two different spectral invariants for **embedded contact homology (ECH)**. ECH is generated by sets of orbits of a **Reeb vector field** on a closed contact three-manifold.

ECH capacities: A *systole* is the shortest homotopically nontrivial loop in a metric space. *ECH capacities* generalize this idea to contact manifolds and a whole spectrum of lengths, one for each nontrivial ECH group. ECH capacities govern many symplectic embeddings.

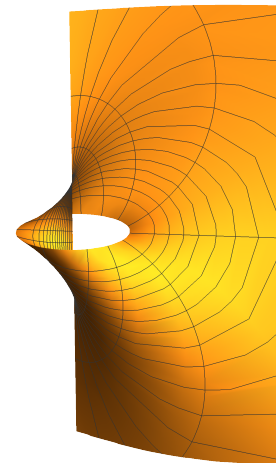
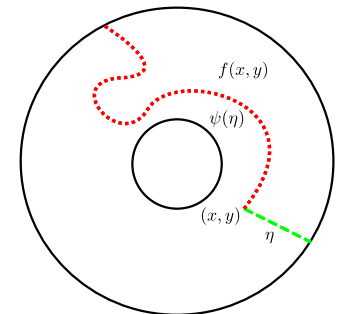
Knot filtration: The ECH chain complex can also be filtered by linking number, or equivalently, intersection number with a page of an open book decomposition. I use it to study surface dynamics.

Applications

Symplectic embeddings

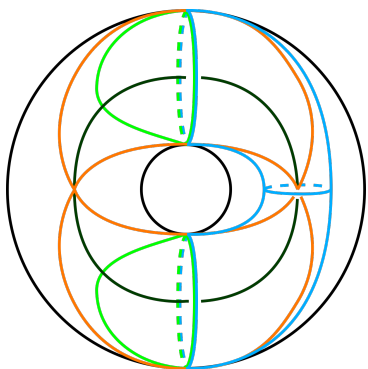


Surface dynamics



Open book decompositions and circle actions

SL(2, R) banana



Morgan Weiler, Cornell University