WORKSHOP ON SYMPLECTIC TOPOLOGY: ABSTRACTS

FILIP BROĆIĆ: Relative Gromov width for disc-cotangent bundle

Abstract. Let (M, g) be Riemannian manifold and $D^*M = \{p \in T^*M \mid |p| \leq 1\}$ disc-cotangent bundle associated to metric g. In the talk, we will give bounds on the Lagrangian version of Gromov width inside D^*M relative to zero section $M \subset D^*M$. The main result follows from energy estimates of J-holomorphic objects whose existence is guaranteed by properties of Wrapped Floer homology. Using the same techniques we provide bounds for relative symplectic packing of two balls inside D^*M. The content of the talk is work in progress.

LEV BUHOVSKY: On Fabry's quotient theorem

Abstract. The Fabry quotient theorem states that for a complex power series with unit radius of convergence, if the quotient of its consecutive coefficients tends to s, then the point z=s is a singular point of the series. In my talk I will try to describe an elementary proof of the theorem.

ERMAN ÇINELI: Topological entropy and Floer theory

Abstract. In this talk I will introduce barcode entropy and discuss its connections to topological entropy. The barcode entropy is a Floer-theoretic invariant of a compactly supported Hamiltonian diffeomorphism, measuring, roughly speaking, the exponential growth under iterations of the number of not-too-short bars in the barcode of the Floer complex. The topological entropy bounds from above the barcode entropy and, conversely, the barcode entropy is bounded from below by the topological entropy of any hyperbolic invariant set. As a consequence, the two quantities are equal for Hamiltonian diffeomorphisms of closed surfaces. The talk is based on a joint work with Viktor Ginzburg and Basak Gurel.

DUŠAN JOKSIMOVIĆ: A Hölder-type inequality for the C^0 distance and Anosov-Katok pseudo-rotations

Abstract. In this talk, we will show that sufficiently fast convergence in Hofer/spectral metric forces C^0 convergence. We achieve this by proving a Hölder-type inequality for Hamiltonian diffeomorphisms relating the C^0 norm, the C^0 norm of the derivative, and the Hofer/spectral norm. As an application of our Hölder-type inequality, we prove C^0 rigidity for a certain class of pseudo-rotations. In the first part of the talk, we will state the main results and prove the inequality. In the second part, we will introduce the class of Anosov-Katok pseudo-rotations, show how one can define their rotation number, and prove (using the inequality) that such pseudo-rotations

with exponentially Liouville rotation numbers are C^0 rigid. This talk is based on joint work with Sobhan Seyfaddini.

LEONID POLTEROVICH: Symplectic topology and ideal-valued measures

Abstract. We adapt Gromov's notion of ideal-valued measures to symplectic topology by using Varolgunes' relative symplectic cohomology. This leads to a unified viewpoint at three "big fiber theorems": the Centerpoint Theorem in combinatorial geometry, the Maximal Fiber Inequality in topology, and the Non-displaceable Fiber Theorem in symplectic topology, and yields applications to symplectic rigidity. Joint work with Adi Dickstein, Yaniv Ganor, and Frol Zapolsky.

DIETMAR SALAMON: Almost complex structures and Hamiltonian symplectomorphisms

Abstract. The space of compatible almost complex structures on a closed symplectic manifold can be viewed as an infinite-dimensional Kaehler manifold, equipped with a Hamiltonian group action by the group of Hamiltonian symplectomorphisms, where the moment map is the scalar curvature (Quillen-Fujiki-Donaldson). This talk will explore to what extent the familiar parallel between finite-dimensional GIT and this infinite-dimensional setting carries over from integrable to non-integrable almost complex structures, and pose some open questions.

GLEB SMIRNOV: Infinitely generated symplectic mapping class groups

Abstract. We will look for symplectic manifolds with infinitely generated symplectic mapping class groups. Two series of such examples will be discussed.

MAKSIM STOKIĆ: Flexibility of the adjoint action of the group of Hamiltonian diffeomorphisms

Abstract. Let $u \in C_0^\infty(M)$ be a non-constant zero-normalized function on a closed symplectic manifold (M, ω). Our main result is that any zero-normalized function $f \in C_0^\infty(M)$ can be represented as a finite sum of pullbacks of u by some Hamiltonian diffeomorphisms, such that the number of terms in the sum is bounded from above by the constant multiple of the L_∞-norm of f. As a corollary, we get that any $\mathrm{Ham}(M, \omega)$-invariant norm on $C_0^\infty(M)$ is dominated from above by the L_∞-norm. Furthermore, this implies that any bi-invariant Finsler pseudo-metric on $Ham(M, \omega)$ that is generated by an invariant norm on $C_0^\infty(M)$ is either identically zero or equivalent to the Hofer's metric. This is joint work with Lev Buhovsky.

VUKAŠIN STOJISAVLJEVIĆ: Coarse nodal topology and persistence

Abstract. The classical Courant's nodal domain theorem provides an upper bound on the number of nodal domains of a Laplace-Beltrami eigenfunction in terms of its eigenvalue. It has long been known that direct generalizations of this theorem to linear combinations of eigenfunctions fail in general. We will show that by counting nodal domains in a coarse way, i.e. by ignoring small oscillations, one may prove a

version of Courant's theorem for linear combinations as well. The method we use is based on the theory of persistence modules and barcodes, combined with multiscale polynomial approximation in Sobolev spaces. Moreover, we will show how the same method proves a version of Bezout's theorem for linear combinations of Laplace-Beltrami eigenfunctions. The talk is based on a joint work with L. Buhovsky, J. Payette, I. Polterovich, L. Polterovich and E. Shelukhin.

FROL ZAPOLSKY: Approximating quasi-states on manifolds

Abstract. Quasi-states are an interesting generalization of measures. I'll discuss their origin, give basic examples and constructions, and focus on the so-called median quasi-state, which lies at the intersection of the topological theory and symplectic geometry. Since it is so unique, it is interesting to devise an algorithm which explicitly computes it. In a joint work with Adi Dickstein we constructed such an algorithm, and I'll describe it in my talk. On the way I'll introduce an extension of the classical Wasserstein distance on measures to quasi-states. In the symplectic context, the median quasi-state is a particular case of a general construction due to Entov-Polterovich, which produces very special quasi-states on symplectic manifolds, namely, symplectic quasi-states. Motivated by an interpretation of symplectic quasi-states as possible generalizations of physical states in classical mechanics, Polterovich proved a restriction on their projections to the factors of $S^2 \times S^2$. Time permitting, I'll state this restriction and discuss a quantitative version using the Wasserstein metric.

FABIAN ZILTENER: Capacities as a complete symplectic invariant

Abstract. This talk is about joint work with Yann Guggisberg. The main result is that the set of generalized symplectic capacities is a complete invariant for every symplectic category whose objects are of the form (M, ω), such that M is compact and 1-connected, ω is exact, and there exists a boundary component of M with negative helicity. This answers a question by Cieliebak, Hofer, Latschev, and Schlenk. It appears to be the first result concerning this question, except for results for manifolds of dimension 2, ellipsoids, and polydiscs in $\mathbb{R}^4$.

FILIP ŽIVANOVIĆ: Symplectic cohomology of symplectic manifolds admitting contracting $\mathbb{C}^*$-actions

Abstract. In this joint work with Alexander Ritter, we construct symplectic cohomology for a class of symplectic manifolds that admit pseudo-holomorphic $\mathbb{C}^*$-actions whose S^1-part is Hamiltonian, and which project S^1-equivariantly and properly to a convex symplectic manifold. There is a large class of interesting examples of such spaces, including many equivariant resolutions of singularities. These spaces are in general highly non-exact at infinity, so along the way we develop foundational results to be able to apply Floer theory. Motivated by work of Ritter-McLean on the Cohomological McKay Correspondence, our goal is to describe the ordinary cohomology of the resolution in terms of a Morse-Bott spectral sequence for positive symplectic cohomology. These spectral sequences turn out to be quite computable

in many examples. We also obtain a filtration on quantum cohomology by ideals, and interestingly these filtrations can be dependent on the choice of circle action.