Symplectic topology, contact topology and interactions, Paris

Report of Contributions

https://indico.math.cnrs.fr/e/symplectic2021

Contribution ID: **4** Type: **not specified**

Compact objects in the Fukaya category and representations of Eliashberg-Chekanov algebra

Friday, May 7, 2021 10:45 AM (1 hour)

Let L be a compact Lagrangian in a Weinstein manifold
obtained from a subcritical one by attaching a handle along a Legendrian V. We will see how to associate to L a filling of a satelite of V and how this one induces a representation of the Chekanov-Eliashberg algebra of V. We will show that Legendrian contact homology linearised with respect to this representation recovers the Floer homology of L. We will talk about extensions of this considerations to A-infinity opérations on both sides. This is a joint work with G. Dimitroglou-Rizell and P. Ghiggini.

Presenter: CHANTRAINE, Baptiste (Université de Nantes)

Session Classification: Séminaire

Contribution ID: **5** Type: **not specified**

Many real projective spaces are not Liouville fillable

Friday, May 7, 2021 1:45 PM (1 hour)

I will show that the standard contact structure on the real projective spaces RP^{4k+1} is not Liouville fillable using a classical argument on degeneration of moduli spaces of holomorphic spheres. A stronger result has been obtained by Zhengyi Zhou using more algebraic methods. This is a joint work with Klaus Niederküger

Presenter: GHIGGINI, Paolo (CNRS/Université de Nantes)

Session Classification: Séminaire

Contribution ID: **6** Type: **not specified**

Bi-invariant Lorentz-Finsler structures on the linear symplectic group and contactomorphism group

Friday, May 28, 2021 10:45 AM (1 hour)

Presenter: ABBONDANDOLO, Alberto (Ruhr-University Bochum)

Session Classification: Séminaire

Contribution ID: **7** Type: **not specified**

A few properties of Besse contact manifolds

Friday, May 28, 2021 1:45 PM (1 hour)

Presenter: MAZZUCCHELLI, Marco

Session Classification: Séminaire

Contribution ID: **9** Type: **not specified**

Rigidity phenomena in Billiard and Hamiltonian Dynamics

Friday, June 4, 2021 10:45 AM (1 hour)

Presenter: SORRENTINO, Alfonso (University of Rome Tor Vergata)

Session Classification: Séminaire

Contribution ID: **10** Type: **not specified**

Around a Question of Entov-Polterovich-Py

Friday, June 4, 2021 1:45 PM (1 hour)

Presenter: KAWAMOTO, Yusuke (Ecole Normale Superieure)

Session Classification: Séminaire

Contribution ID: **11** Type: **not specified**

The genus-one question for open book decomposition

Friday, June 11, 2021 10:45 AM (1 hour)

Presenter: DEHORNOY, Pierre (Université Grenoble Alpes)

Session Classification: Séminaire

Contribution ID: **12** Type: **not specified**

Triangulation and persistence

Friday, June 11, 2021 1:45 PM (1 hour)

Mixing triangulation (in the sense of triangulated categories) with persistence (as in persistence modules) leads to a class of interesting pseudo-metrics in a variety of examples: metric spaces, Tamarkin categories, filtered topological spaces, Fukaya
categories. I will discuss some generalities concerning this machinery and how it specifically applies to the symplectic context. The talk is based on joint work with
Paul Biran (ETH) and Jun Zhang (CRM).

Presenter: CORNEA, Octav (University of Montreal)

Session Classification: Séminaire

Contribution ID: **13** Type: **not specified**

Tropical Fukaya Algebras

Friday, June 18, 2021 10:45 AM (1 hour)

A multiple cut operation on a symplectic manifold produces a collection of cut spaces, each containing relative normal crossing divisors. We explore what happens to curve count-based invariants when a collection of cuts is applied to a symplectic manifold. The invariant we consider is the Fukaya algebra of a Lagrangian submanifold that is contained in the complement of relative divisors. The ordinary Fukaya algebra in the unbroken manifold is homotopy equivalent to a broken Fukaya algebra' whose structure maps countbroken disks' associated with rigid tropical graphs. Via a further degeneration, the broken Fukaya algebra is homotopy equivalent to a 'tropical Fukaya algebra' whose structure maps are sums of products over vertices of tropical graphs. This is joint work with Chris Woodward.

Presenter: VENUGOPALAN, Sushmita (Institute of Mathematical Sciences, Chennai)

Session Classification: Séminaire

Contribution ID: **14** Type: **not specified**

Khovanov homology and the cinquefoil

Friday, June 18, 2021 1:45 PM (1 hour)

Presenter: SIVEK, Steven

Session Classification: Séminaire

Contribution ID: **15** Type: **not specified**

Rabinowitz Floer complex for Lagrangian cobordisms

Tuesday, June 29, 2021 3:00 PM (1 hour)

I will define a Floer complex associated to a pair of transverse Lagrangian cobordisms in the symplectization of a contact manifold, by a count of SFT pseudo-holomorphic discs. Then I will show that this complex is endowed with an A_\infty structure. Moreover, I will describe a continuation element in the complex associated to a cobordism L and a small transverse push-off of L.

Presenter: LEGOUT, Noémie (Uppsala university)

Contribution ID: **16** Type: **not specified**

String topology and self-intersections

Friday, July 2, 2021 10:45 AM (1 hour)

String topology studies the algebraic structure of the homology of the free loop space of a manifold. I'll describe joint work with Nathalie Wahl about string topology operations, and about what these operations compute. We have simplified, chain-level definitions for the "loop" or "string" product and coproduct. The new definitions make possible new links between geometry and loop products. For example, If the k-fold coproduct of a homology class X on LM is nontrivial, then every representative of X contains a loop with a (k+1)-fold self-intersection.

Presenter: HINGSTON, Nancy (College of New Jersey)

Contribution ID: **17** Type: **not specified**

Symplectic cohomology and ideal valued measures

Friday, July 2, 2021 1:45 PM (1 hour)

I will discuss three "big fiber theorems", the Centerpoint Theorem from combinatorics, the Gromov Maximal Fiber Theorem from topology, and the Non-displaceable Fiber Theorem by Entov and myself, from a unified viewpoint provided by Gromov's ideal-valued measures.
The latter theory, in the symplectic context, is combined with relative symplectic cohomology developed by Varolgunes, yielding some applications to symplectic rigidity. Necessary preliminaries will be explained. A work in progress with Adi Dickstein, Yaniv Ganor, and Frol Zapolsky.

Presenter: POLTEROVICH, Leonid (Tel Aviv University)

Contribution ID: **18** Type: **not specified**

Symplectically knotted cubes

Friday, July 2, 2021 3:15 PM (1 hour)

While by a result of McDuff the space of symplectic embeddings of a closed 4-ball into an open 4-ball is connected,
the situation for embeddings of cubes $\boxtimes^4=\boxtimes^2\times\boxtimes^2$ is very different. For instance, for the open ball $\boxtimes^4$ of capacity 1, there exists an explicit decreasing sequence $\boxtimes_1,\boxtimes_2,\dots\longrightarrow 1/3$ such that for $\boxtimes<\boxtimes_k$ there are at least k symplectic embeddings of the closed cube $\boxtimes^4(\boxtimes)$ of capacity $\boxtimes$ into $\boxtimes^4$ that are not isotopic. Furthermore, there are infinitely many non-isotopic symplectic embeddings of $\boxtimes^4(1/3)$ into $\boxtimes^4$.
A similar result holds for several other targets, like the open 4-cube, the complex projective plane, the product of two equal 2-spheres,
or a monotone product of such manifolds and any closed monotone toric symplectic manifold.
The proof uses exotic Lagrangian tori.
This is joint work with Joé Brendel and Grisha Mikhalkin.

Presenter: SCHLENK, Felix (Université de Neuchâtel)

Contribution ID: **19** Type: **not specified**

Progress towards new examples of knot-filtered ECH

Tuesday, July 13, 2021 3:00 PM (1 hour)

Knot-filtered embedded contact homology is an invariant of an elliptic Reeb orbit of any contact form for a given contact structure on a closed, oriented three-manifold. It was introduced in a 2016 paper of Hutchings and enables embedded contact homology (ECH) to recover the Calabi invariant of the return map of a global surface of section of the Reeb vector field. Knot-filtered ECH is an invariant of the contact structure rather than the contact form, so it would be interesting to know what features of the contact structure it records. We will explain work in progress with Jo Nelson towards computing the knot filtered ECH of the right- and left-handed trefoil knots as elliptic orbits for different contact structures on S^3.

Presenter: WEILER, Morgan

Contribution ID: **20** Type: **not specified**

Non-squeezing of Legendrian knots into neighbourhoods of non-Legendrians and C^0 contactomorphisms

Friday, July 9, 2021 1:45 PM (1 hour)

We discuss joint work with M. Sullivan where we show that a contactomorphism cannot squeeze some fixed Legendrian knot into an arbitrarily small neighbourhood of a non-Legendrian knot, under the additional constraint that the two knots become isotopic inside the neighbourhood, and that the contact manifold is tight. The techniques used are Giroux's theory of convex surfaces combined with Honda's study of solid tori with convex boundary. A corollary is that a smooth image of a Legendrian under a C^0-contactomorphism is again Legendrian (here tightness is not needed).

Presenter: DIMITROGLOU RIZELL, Georgios (Uppsala University)

Contribution ID: **21** Type: **not specified**

Orbifold Lagrangian Floer theory

Friday, July 9, 2021 10:45 AM (1 hour)

I will present a set-up for orbifold Lagrangian Floer theory,
We introduce the notion of dihedral twisted sectors for Lagrangians, intersections of Lagrangians. Then I explain their role in the construction of Floer theory. It is in collaboration with Bohui Chen and Bai-Ling Wang.

Presenter: ONO, Kaoru (Research Institute for Mathematical Sciences, Kyoto University)

Contribution ID: **22** Type: **not specified**

The Floer jungle: 35 years of Floer theory

Friday, July 16, 2021 3:15 PM (1 hour)

Presenter: HOFER, Helmut (Institute for Advanced Study, Princeton)