

Workshop on “Floer and Novikov Homology, Contact Topology and Related Topics”

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This International Workshop was held at the Kavli IPMU from April 21 to April 24, 2014. The aim of the meeting was to bring together the experts from different domains of geometry and topology related to the Floer and Novikov homology and the contact topology. There were 13 speakers and about 50 participants in total.

An application of the classical algebro-topological tools to the contact topology (namely to the growth of the number of Reeb chords in the cotangent bundles) was the subject of the talk by Urs Frauenfelder (joint with F. Schlenk), which opened the Workshop.

The Floer theory was the subject of the talk of Mihai Damian, who spoke about lifted Floer cohomology, which is a variant of Lagrangian Floer cohomology and its application to topology of monotone Lagrangian submanifolds. His methods allow in particular to show that nontrivial connected sums of manifolds of odd dimensions do not admit monotone embeddings to the complex affine space.

Kei Irie gave an estimate of Hofer-Zehnder capacity using symplectic homology, product structures, and Chas-Sullivan loop product.

A generalization of the Morse-Novikov theory to the case of ANR

spaces and continuous maps was discussed in the talk of Dan Burghela. He suggested new topological invariants related to such maps, and computer-friendly tools to calculate these invariants. F. Manjarrez-Gutierrez spoke about the Morse-Novikov number for a -small knots. A conjecture, due to M. Boileau and C. Weber, says that the Morse-Novikov number for knots is additive, similarly to the knot genus. F. Manjarrez-Gutierrez confirmed this conjecture for the class of a -small knots.

Classical Morse theory was discussed in the talk of Manabu Akaho, who presented his construction of a Morse complex for Morse functions on manifolds with boundary. Tadayuki Watanabe spoke about relations of the Morse theory to Chern-Simons perturbation theory.

The talk of Yasha Saveliev was dedicated to the global Fukaya category and its applications to Hofer geometry.

Several talks were dedicated to the contact topology. River Chiang

presented some examples of higher dimensional non-fillable contact manifolds. Tetsuya Ito's lecture was about open book foliations. Otto van Koert spoke about fractional twists in contact topology.

S. Sandon spoke about the positive loops of contactomorphisms. She explained how non-squeezing property for contact manifolds holds or fails, and how the group of contactomorphisms admits or does not admit orderability.

The conclusive talk of the Workshop was delivered by Vincent Colin. His joint work in progress with Ko Honda is related to both the contact topology and the Floer homology. He presented a construction of a hat version of Heegaard Floer homology for contact manifolds of arbitrary odd dimension.

The Workshop was a highly successful event that enabled experts in symplectic and contact topology from all over the world to present their results and communicate with each other.

