Cornell University

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Math 6630: Symplectic Geometry, Spring 2018

Topics for student presentations

- Equivariant Darboux Theorem [4].
- Alternative proofs of Darboux Theorem using Euler-like vector fields [1, 8].
- Morse Theory [9].
- Using Morse theory to read the cohomology of a toric symplectic manifold from its moment polytope [5, 6].
- Groupoids: definition and examples [11].
- Poisson Geometry: Poisson manifolds are foliated by symplectic leaves [3, 10].
- Contact forms and dynamics [2].
- Classifying circle actions on four-dimensional manifolds [7].

References

[1] H. Bursztyn, H. Lima, E. Meinrenken, *Splitting theorems for Poisson and related structures*, to appear in J. Reine Angew. Math. arXiv:1605.05386

[2] A. Cannas da Silva, *Lectures on symplectic geometry*, Lecture Notes in Mathematics, Springer-Verlag, 2008.

[3] J. P. Dufour and N. T. Zung, *Normal forms of Poisson structures*, Geometry and Topology Monographs **17** (2011), 109–169.

[4] M. Dellnitz and I. Melbourne, *The equivariant Darboux theorem*, Exploiting Symmetry in Applied and Numerical Analysis (Editors: E. Allgower et al): 1992 AMS-SIAM Summer Seminar Proceedings. Lectures in Appl. Math. **29** (1993), 163–169.

[5] G. Ewald, *Combinatorial convexity and algebraic geometry*, Springer-Verlag, 1996.

[6] W. Fulton, *Introduction to toric varieties*, Princeton University Press, 1993.

[7] Y. Karshon, *Periodic Hamiltonian flows on four dimensional manifolds*, Memoirs of the Amer. Math. Soc. **672** (1999).

[8] E. Meinrenken, *Euler-like vector fields* (Lecture Notes).

[9] J. W. Milnor, *Morse Theory*, Princeton University Press, 1963.

[10] A. Weinstein, *The local structure of Poisson manifolds*, J. Differential Geom. **18**, no. 3 (1983), 523–557.

[11] A. Weinstein, *Groupoids: unifying internal and external symmetry*, Notices of the Amer. Math. Soc. **43**, no. 7 (1996), 744–752.