

Symplectic Geometry Seminar

Symplectic Criteria on Stratified Uniruledness of Affine Varieties and Applications

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In the late 1980's, Floer developed generalized Morse theories, where the generators of the complex are critical points of action functionals on various moduli spaces, solutions of certain ODEs, and the gradient flow lines are solutions of certain elliptic PDEs. Floer's breakthrough construction is based on that era's other breakthrough works done by Uhlenbeck, Gromov, Donaldson, Taubes, Witten and many others. In this talk, we use one of his theories, called Hamiltonian Floer (co)homology and Symplectic (co)homology, that is a Morse (co)homology on the loop space of a symplectic manifold with Hamiltonian function on it. After reviewing definitions and some properties, we introduce criteria for affine varieties to admit uniruled subvarieties of certain dimensions. The measurements are from long exact sequences of versions of symplectic cohomology. We provide applications of the criteria in birational geometry of log pairs in the direction of the Minimal Model Program. This work is based on my PhD thesis under the supervision of Prof. Mark McLean and the reference is the arXiv preprint, [arXiv:2201.10669](https://arxiv.org/abs/2201.10669).

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