Jingxiang Ma

Male, 24years

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Education

Sep 2019- present **M.S.**, *School of Mathematical Science*, Peking University.

- Supervisor: Prof. HuijunFan

Sep 2015- Aug 2019 **B.S.**, *Yuanpei College*, Peking University.

- Thesis Advisor: Prof. XiaohuaZhu

Area of Interests

- Symplectic and Algebraic Geometry
- Recently I'm interested in symplectic quotients and geometric invariant theory.

Honors and Awards

2020- 2021 **Peking University Excellent Scientific Research Award**.

Academic Experiences

Mar 2019- Jun 2019 **Undergraduate Thesis**, under supervision of Prof. Xiaohua Zhu.

- **Topic:** Octonians and almost complex structures on the 6-sphere
- This thesis is a survey on the same topic. It includes the construction of the canonical almost complex structure on the 6-sphere using the structure of Octonians, and also S.S.Chern's results on the nonexistence of some admissible complex structures on the 6-sphere.

Dec 2019 **Undergraduate-level Academic Seminar, Reporter**.

- **Topic:** Real cohomology ring of complex grassmannian
- This report is based on the last chapter of Bott Tu's book 'Differential Forms in Algebraic Topology'.

Jul 2020- Aug 2020 **Directed Reading**, under supervision of Prof. Huijun Fan.

- **Topic:** Stable bundles over Riemann surfaces

- This topic is mainly about the Kobayashi-Hithin correspondence on the Riemann surfaces case. I read related papers of Atiyah&Bott and Donaldson. The goal is to understand this correspondence as a infinite dimensional Kempf-Ness Theorem.

Dec 2020-Mar 2021 **Graduate-level Academic Seminar, Reporter**, under supervision of Prof. Huijun Fan.

- **Topic:** Cohomology of quotients in algebraic and symplectic geometry
- This report is based on Kirwan's article with the same topic. Through this topic I learned how to stratify a manifold based on a Hamiltonian action, and also how to compute the cohomology of the (GIT) quotients in the case that stabilizers are finite.

Dec 2020-May 2021 **Graduate-level Academic Seminar, Reporter**, under supervision of Prof. Huijun Fan.

- **Topic:** Basic Geometric Invariant Theory
- This report is the natural succesion of formal ones. I learned basic Geometric Invariant Theory. This includes topological and numerical criterions of GIT-(semi)stability, and also the proof of Kempf- Ness Theorem, which is about the isomorphism between the GIT quotient and symplectic quotient.

May 2021-Sep 2021 **Graduate-level Academic Seminar, Reporter**, under supervision of Prof. Huijun Fan.

- **Topic:** VGIT of a torus action on a projective space
- This report is based on some readings and exercises of the same topic. I mainly focus on two cases: the first case is C* action on a vector space. In this case I described how the quotients depends on three types of characters. Then I introduced some results on torus action on a projective space. I explained how to divide the weight polytope into faces, each of which determine a kind of quotient. Additionally I explained how to study the morphisms between different quotients induced by inclusion of faces. The next example I want to learn is VGIT of the diagonal $SL(V)$ action on $P(V)^m$.

Sep 2021-present **Directed Reading**, under supervision of Prof. Huijun Fan.

- **Topic:** Localization formula and the Kalkman's formula
- This topic is about the study of how invariants change under a VGIT transformation. One way to understand it is to consider the GIT quotients as symplectic quotients and to study the evaluation on the Kirwan map. The result is known as Kalkman's formula. Since it is related with integral on quotients, I need to study localization formulas. This topic is still in progress.

Skills

- **Language:** LaTeX
- **Tools:** Endnote

Extracurricular Activities

- **Voluntary Work:**
  I participated in a volunteer activity at Beijing Xinxuedao Linchuan School in the fall of 2016, where my job was to help high school students increase their interest in mathematics.
  I took an intro-course of basic knowledge of aids in 2020, and through it I got a rescue skills certification of Red-cross Society of China Beijing Branch.
- **Club Activities:**
  We set up a film club in Yuanpei College, Peking University in the summer of 2017. Our club is named by YPUC and our WeChat official account has more than 6,000 followers now.
- **Sports:**
  I am a member of the graduate basketball team of the School of Mathematical Sciences, Peking University. Our team won the championship of a school-level basketball game in the summer of 2021.