Jie Wei

(+86)13974317682 | 12432029@mail.sustech.edu.cn | Shenzhen, China

My Homepage: https://williamjayed.github.io/CV.html

EDUCATION

Southwest Jiaotong University School of Mathematics
Bachelor of Mathematics and Applied Mathematics Sept. 2020 – Jun. 2024

Supervised by Prof. Zhongwei Yang

Southern University of Science and Technology Department of Mathematics
Candidate for Master of Pure Mathematics Sept. 2024 – present

Supervised by Prof. Yong Hu

My current research interests: number theory and arithmetic geometry

- rational points on varieties, Galois cohomology of linear algebraic group.
- Brauer-Manin obstruction and related topics.
- arithmetic of quadratic forms and related structures.

RESEARCH EXPERIENCE

Representations of compact groups my undergraduate thesis
supervised by Prof. Zhongwei Yang 2023/09-2024/06

- In this paper, the representation theory of compact groups is reviewed by us.
- We give a concise introduction to the Haar measure of locally compact Hausdorff groups and apply it to to study the unitary representations of compact groups over complex number fields.
- In particular, we calculate detailedly the irreducible representations of the classical group SU(2).

Quadratic forms Seminar
supervised by Prof. Yong Hu 2024/04-2024/12

- The main topic contains the classical theory of bilinear forms and quadratic forms over arbitrary fields of characteristic free, such as the Witt theory, Pfister forms, and classification theorem of quadratic forms.
- Among the contents above, Clifford algebra and its structure theorem of quadratic forms is one of my tasks to organize, especially the 1-1 correspondence between binary quadratic forms and quadratic algebras.
- The cohomological invariants of quadratic forms, related to the well-known Milnor conjecture(solved by Voevodsky in 2003 by means of motivic cohomology), is one of our interested topics, which can be used to determine the relationship between quadratic forms and Galois cohomology.

Galois Cohomology of linear algebraic groups Seminar
supervised by Prof. Yong Hu 2024/10-present

- The linear algebraic group over algebraically closed field is studied by us systematically, which covers the basic contents of categorical quotients, Borel subgroups, maximal tori and reductive groups.
- We use the method of Galois cohomology to compute the Brauer group of local(resp. global) field and study the reciprocity law, maximal abelian extension and extenstence theorem in local(resp. global) class field theory.
- There are many powerful technique we have used: Tate-Nakayama theorem, Tate duality, Lubin-Tate theory, cohomology of the idède group, Poitou-Tate dualty, Čebotarev theorem and etc.
- We are also concerned with the analogue results on Grothendieck site, torsors, abelian varieties, algebraic stack by means of the method of descent theory and étale cohomology.

Algebraic geometry: Curves, Surfaces and Fano varieties Courses and Lecture series

- We use Čech Cohomology to compute the Serre duality and Kodaira vanishing theorem, which is one of the deepest theory of modern algebraic geometry.
- Riemann-Roch theorem of Curves is discussed detailedly, which is applied to classify the curve of genus less than 5.
- Besides, the general Riemann-Roch problem is introduced and we also learn a little more intersection theory, such as cycles and chow group, to study R-R thm in case of surfaces and high dimension cases. Rational points on homogenous varieties and Brauer-Manin obstruction are my current research topics.

ACADEMIC ACTIVITIES

- Chengdu, Jul. 2022, alegbraic topology seminar at Sichuan University, homology theory and the computation axioms of homology group, taught by Prof. Haibao Duan(USTC).
- Chengdu, Mar. 2023, the forums of algebra, number field and combinatorics at Sichuan University, unboundedness of TateShafarevich groups in cyclic extensions, talked by YiOuyang(USTC).
- Chengdu, from Mar.2023 to May 2023, the seminar of Lie algebras and representation theory at Sichuan University, on Wednesdayper week, held by Prof. Ming Lu.
- Chengdu, May 2023, the workshop on logic at Sichuan University, model theory and applications on nonstandard analysis.
- Xiamen, Jun. 2023, the short course of arithmetic geometry at Xiamen University, Mordell-Weil theorem, taught by Prof. Qing Liu(University of Bordeaux).
- Chengdu, Oct. 2023, Coset theory and Kac-Wakimoto hypothesis(VOA), talked by Prof. Chongying Dong(UC SANTA CRUZ).
- Chengdu, Oct. 2023, the cyclotomic Brauer category, talked by Prof. Hebing Rui(Tongji University).
- Shenzhen, from Feb. 2024 to May 2024, visiting the research group of Prof. Yong Hu, department of Mathematics, at Southern University of Science and Technology.
- Beijing, from Jul. 2024 to Aug. 2024, the joint AMSS-PKU algebra and number theory summer school.
- Shenzhen, Aug. 2024, the conference of number theory and arithmetic geometry of Southern University of Science and Technology, held by Prof. Yong Hu.
- Xiamen, Nov. 2024, the short course of arithmetic geometry at Xiamen University, An Introduction to Abelian Varieties, taught by Prof. Qing Liu(University of Bordeaux).
- Shenzhen, Nov. 2024, the International conference of Non-Associative Algebras, Representations and Applications, held by SUSTech International Center for Mathematics.
- Shenzhen, Dec. 2024, the conference of arithmetic in Shenzhen, held by Prof Hui Gao.
- Hangzhou, Mar. 2025, the Diophantine days 2025 at Westlake University.

CERTIFICATE and Work Experience

- **CET-4**: 504.
- **CET-6**: 498.
- PRC's Teacher Certificate.
- Fall 2024; linear algebra; teaching assistant.

SKILLS and HOBBIES

- **Programming and Software**: Python, Matlab, Latex, C++, Office, Mathematica, SPSS, SQL-Server, VS Code.
- **Daily hobbies**: Tour, Watch movies, City Walk, Climb, Take photos.