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A. 研究概要

正標数の体上のスムーズなスキーム上の構成可能層の特異台や特性サイクルが余接束上に定義されるが、これらを定めるような余接束上の層の構成は知られていない。Kashiwara–Schapira は、実多様体上の層に対し超局所化により余接束上に $\mu\mathcal{H}om$ を構成し、それから特異台や特性サイクルを導いている。代数的な場合にも同様の構成ができるか考察し、少なくとも曲線上ではできることを確かめた。

For constructible sheaves on a smooth scheme over a field of positive characteristic, the singular supports and the characteristic cycles are defined on the cotangent bundle but a construction of sheaves on the cotangent bundle giving rise to them is not known. For sheaves on a real manifold, Kashiwara–Schapira defined $\mu\mathcal{H}om$ on the cotangent bundle using microlocalization and derived the singular supports and the characteristic cycles from this. I studied the possibility of an analogous construction in algebraic context and verified that it works at least for curves.

B. 発表論文

1. T. Saito “Graded quotients of ramification groups of local fields with imperfect residue fields”, Amer. J. Math.145 (2023), no.5, 1389–1464.
2. T. Saito “A characterization of ramification groups of local fields with imperfect residue fields”, Arithmetic Geometry, pp 421–433, proceedings of International conference on arithmetic geometry 2020, TIFR.
3. T. Saito “Cotangent bundles and micro-supports in mixed characteristic case”, Algebra & Number Theory 16-2 (2022), 335–368.
4. T. Saito “Frobenius-Witt differentials and regularity”, Algebra & Number Theory 16-2 (2022), 369–391.

5. T. Saito “Characteristic cycles and the conductor of direct image”, Journal of the American Mathematical Society, 34 (2021), 369–410.

C. 口頭発表

1. Characteristic cycles and microlocalization, Motives in Tokyo 2026 on the occasion of Thomas Geisser’s 60th Birthday, February 18, 2026
2. Ramification 1, 2, Ramification theory and reciprocity sheaves, Lecture series, School of Mathematical Sciences, University of Tokyo, Komaba, March 17, 2025.
3. Log monogenic extensions and ramification theory, 2025 Lyon-Tokyo workshop in Number Theory and Arithmetic Geometry, March 28, 2025 ENS de Lyon (フランス)
4. Singular supports in equal and mixed characteristics, Cours de l’IHES, 18, 22, 25, 29 septembre 2025 (フランス)
5. Etale cohomology and micro-local analysis, Colloquia Patavina, 09 October 2025 (イタリア)
6. 平層上の奇異座與特徴圈 (Singular supports and characteristic cycles of an etale sheaf), Taiwan National University, November 18, 20, 25, 27, 2024, February 10, 12, 17, 19, 2025. (台湾)
7. Singular supports in positive and mixed characteristics, Oct. 4, 2024, Oberwolfach, Anabelian Geometry and Representations of Fundamental Groups (ドイツ). Coloss, Lyon (フランス), April 4, 2024 ENS de Lyon
8. On relative singular support in mixed characteristic, 数論幾何学とその周辺, Tokyo Denki University, 2024年5月28日, Regulators V, Pisa, June 13, (イタリア) Arithmetic Geometry, Algebraic Geometry and Analytic Geometry, 東大数理, Séminaire de géométrie arithmétique, (IHES) Jeudi 19 septembre 2024.
9. On the Hasse-Arf theorem, p -adic cohomol-

ogy and arithmetic geometry, October 25, 2024, 東北大学, 第 20 回北陸数論研究集会
2024 年 12 月 6 日, 第 19 回北陸数論研究集会
「超幾何関数の数論とその周辺」2023 年 11 月
25 日, 金沢大学 Arithmetic Geometry, 2023
September 18, IMVAST (ベトナム)

10. Upper ramification groups of local fields with imperfect residue fields, May 30, 31, 2022, Franco-Asian Summer School on Arithmetic Geometry, Centre International de Rencontres Mathématiques (CIRM), Luminy, (フランス)

D. 講義

1. 数理科学概論 I(文科生) 多変数関数の微積分 (教養学部前期課程講義)

F. 対外研究サービス

1. Journal of Algebraic Geometry, エディター
2. Japanese Journal of Mathematics, エディター