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A. 研究概要

正標数の代数閉体上の代数曲面上の ℓ 進層に対し，その特性サイクルを余接束上のサイクルとして定義した．ℓ 進層の Euler 数は特性サイクルと零切断の交点数と等しく，曲線への射の孤立特性点での消失輪体の全次元も曲線の微分形式のひきもどしが定める余接束の切断との交点数として計算できる．これは，１９８０年前後の Deligne と Laumon の結果を完全に一般化するものである．これまでの分岐理論の研究成果に，リジッド幾何からの着想をあわせて得られた結果である．
学部教育改革関係の会議にだいぶ時間をとられてしまったが，微積分の教科書を出版することができた．

For an ℓ-adic sheaf on an algebraic surface over an algebraically closed field, I defined its characteristic cycle as a cycle on the cotangent bundle. The Euler number of an ℓ-adic sheaf equals the intersection number of the characteristic cycle with the 0-section and the total number of the space of vanishing cycles at an isolated characteristic point to a morphism of a curve is computed as the intersection number with the section defined by the pull-back of a differential form on the curve. This completes a result by Deligne and Laumon around 1980. It is proved by using recent results in ramification theory together with an idea from rigid geometry.
Although a considerable amount of time was wasted in reform of undergraduate education, I managed to publish a textbook on calculus.

B. 発表論文

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2. T. Saito “The determinant and the discriminant of a hypersurface of even dimension,” Mathematical Research Letters. 19 (2012), no. 04, 855-871
3. T. Saito “The second Stiefel-Whitney classes of ℓ-adic cohomology,” Journal für die reine und angewandte Mathematik, (2013), Issue 681, 101-147.
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9. A. Abbes and T. Saito “Analyse microlocale ℓ-adique en caractéristique $p > 0$: Le cas d’un trait”, Publications RIMS 45-1 (2009) 25-74

C. 口頭発表

1. l 進層の分岐と特性多様体、 第三回九州合同セミナー 2014 年 1 月 11 日 佐賀大学, Characteristic cycles of a constructible sheaf on a surface, Arithmetic and Algebraic Geometry 2014, 東大数理大講義室 2014 年 1 月 29 日
2. The monodromy weight conjecture and perfectoid spaces (after Peter Scholze), VIASM Annual Meeting 2013, Hanoi, July 20-21, 2012.
3. Wild ramification and the cotangent bundle, 25/01/13 KIAS number theory seminar, 20/02/13 IPMU Inter-desciprinary Colloquim, 13/03/13 IHES Seminaire de mathematiques, 19/03/13 ENS a Lyon, 03/07/13 AMC 2013, Busan, 24/07/13 PANT (Pan Asia Number Theory) conference, VIASM,

4. Introduction to wild ramification of schemes and sheaves, Arizona Winter School 2012: Ramification and Geometry March 10-14, 2012, University of Arizona in Tucson Uni Padova March 19-30, 2012

5. Discriminant and determinant of a hypersurface of even dimension, 2011年7/27(水) 代数学コロキウム 東大数理　123教室, 仙台シンポジウム 2011年8/2 (火)、Une apresmidi de Geometrie Arithmetique a l'IHES 12 septembre, 2011, 2011 Japan-Taiwan Mini workshop on Arithmetic Algebraic Geometry and related topics, Nov. 17-19. Number theory seminar, University of Chicago, 2012 Jan. 18, Arithmetic and Algebraic Geometry 2012 Univ. of Tokyo, 2012 Feb. 17.

6. Discriminant and the determinant of a complete intersection, Okinawa Shogaku, 10:00-11:20, Oct. 10, 2011, Workshop on arithmetic geometry 2011

7. Second Stiefel-Whitney class of ℓ-adic cohomology, 東北大学代数幾何セミナー、2011年1月14日 (金) Geometrie Arithmetique et motivique, CIRM, 19 septembre 2011. Galois Representations and Arithmetic Geometry, Institut de Mathematiques de Bordeaux, 15:15-16:15, July 11 2012. Orsay, 26-03-2013,

8. An ℓ-adic Riemann-Roch formula (joint work with Kazuya Kato), Geometric Langlands seminar, University of Chicago, 2012 Jan. 16, Conf. in honor of Jean-Marc Fontaine, IHP フランス, March 25, Regulator III, Barcelona スペイン, July 20, 代数的整数論とその周辺 数理研 2010年12月6日

9. Wild ramification of schemes and sheaves, ICM, Hyderabad インド, August 27, PANT, Kyoto 日本, September 17, Witt vectors, foliations, and absolute de Rham cohomology, Nagoya 日本 2010 Nov 24, Seoul-Tokyo Conference on Arithmetic and Algebraic Geometry KIAS ソウル 2010 Nov. 26, Arithmetic and Algebraic Geometry 2011 東京 Jan. 22. 2010

10. Characteristic cycle of an ℓ-adic sheaf, Tsinghua, Beijing 中国, East Asia number theory conference, 2009 Aug. 19-22.

D. 講義

1. 数学 I : 微積分 (教養学部前期課程講義).
2. 数理科学 I : 微積分の続き (教養学部前期課程講義).

F. 対外研究サービス

1. 第12,13回高木レクチャー　5月25, 26日, 11月16,17日オーガナイザー
2. 玉原数論幾何研究集会，6月3日 (月)–6月6日 (木) オーガナイザー
3. Documenta Mathematica, エディター
4. Japanese Journal of Mathematics, エディター