Workshop Program

VIASM

21-22/11/2022

1. Nguyễn Đặng Hồ Hải, (Hue University of Science, Vietnam)

   Title: On a special case of the BLSZ complex.

   Abstract: Given an elementary 2-abelian group V and a finite V-CW-complex X, Bourguiba, Lannes,Schwartz and Zarati (BLSZ) have recently introduced a finite complex of unstable modules (equiped with an action of $H^*(V;\mathbb{F}_2)$). The complex begins with the mod-2 V-equivariant cohomology of X and ends with the mod-2 V-equivariant cohomology (with compact support) of the V-regular part of X. It is shown to be exact if and only if the mod-2 V-equivariant cohomology of X is free over H^*V.

   In this talk, we are interested in the case when the BLSZ complex starts with the principal ideal of H^*V generated by a power of the top Dickson invariant ω_V. In particular, we relate this to the minimal injective resolution of the Steinberg summand of $\omega_V^2 H^*V$.

2. Ngô Anh Tuấn, (VNU - Hanoi University of Science)

   Title: The Margolis homology of the cohomology restriction from an extra-special group to its maximal elementary abelian subgroups.

   Abstract: Let p be an odd prime and let G be an extra - special p-group of order $p^{2n+1}(n \geq 1)$. We completely compute the mod p Margolis homology of the image $ImRes(A, G)$ for every maximal elementary abelian p-subgroup A of G.

3. Nguyễn Thế Cường (VNU - Hanoi University of Science)

   Title: Topological realization of some unstable modules.

   Abstract: Thanks to the unstable Adams spectral sequence, we can use homological algebra of unstable modules to compute topological invariants. It is then important to construct projective and injective resolutions of unstable modules. In search for resolutions of the singular cohomlogy of the infinite complex projective space, we found a new connection between this space and spheres. Generalizing this phenomenon, we study the singular cohomology of the infinite quarternionic projective space. In this talk, we construct a particular resolution of the singular cohomology of the infinite quarternionic projective space and realize all terms of the resolution as singular cohomology of spaces.

4. Hans-Werner Henn (Strasbourg University, France)

   Title: On the Brown Comenetz dual of the $K(2)$-local sphere at the prime 2.

   Abstract: The Brown Comenetz dual I of the sphere represents the functor which on a spectrum X is given by the Pontryagin dual of the 0-th homotopy group of X. For a prime p and a chromatic level n there is a $K(n)$-local version I_n of I. For a type n-complex X this is given by the Pontryagin dual of the 0-th homotopy group of the $K(n)$-localization of X. By work of Hopkins and Gross the homotopy type of the spectra I_n for a prime p is determined by its Morava module if p is sufficiently large. For small primes the result of Hopkins and Gross determines I_n modulo an "error term". For $n = 1$ every odd prime is sufficiently large and the case of the prime 2 has been understood for almost 30 years. For $n > 2$ very little is known if the prime is small. For $n = 2$ every prime bigger then 3 is sufficiently large. The case $p = 3$ has been settled in joint work with Paul Goerss. This talk is a report on work in progress with Paul Goerss on the case $p = 2$. The "error term"is given by an element in the exotic Picard group which in this case is an explicitly known abelian group of order 2^9. We use chromatic splitting in order to get information on the error term.

5. Bùi Anh Tuấn, (VNU - Ho Chi Minh University of Science)

   Title: On the (co)homology of Oeljeklaus-Toma manifolds and some certain S-arithmetic groups.

   Abstract: This will be a casual introduction to the topics that we are interested in. We will firstly talk about the computational problem on the torsion homology of Oeljeklaus-Toma manifolds. In their recent work, Oliver Braunling et al have shown that the amount of torsion first homology of OT manifold grows in a controlled way along n. This motivates the question to investigate the remaining torsion homology. The second half of the talk will be about some obstacles in the computation of the integral cohomology of $PSL_2\mathbb{Z}[1/2p]$ where p is a prime greater than 3.

6. Nguyễn Đức Ngà (Phenikaa University, Hanoi, Vietnam)

   Title: The mod 2 Margolis homology of the invariants under the Sylow subgroup of the general linear group.

   Abstract: In this talk, we completely compute the mod 2 Margolis homology of the Mùi algebra $M_n = \mathbb{F}_2[x_1, x_2, \ldots, x_n]^{GL_{n,2}}$ where $GL_{n,2}$ denotes the Sylow 2-subgroup of $GL(n, \mathbb{F}_2)$, i.e., the homology of M_n with the differential to be the Milnor operation Q_j, for every n and j. The motivation for this problem is that, the Margolis homology of the Mùi algebra plays a key role in study of the Morava K-theory $K(j) * (BS_{m,2})$ of the Sylow 2-subgroup of the symmetric group S_m on m letters. We prove that for $n = 1$ or 2, the j-th Margolis homology of the n-th Mùi algebra is represented by elements in M_n^2 only. For $n \geq 3$, this phenomenon is no longer true, because of the occurrence of some "critical elements" $h_{m,s_1,\ldots,s_k}$ which we create, in the homology for $0 < m+1 < s_1 < \cdots < s_k \leq n$. The mod 2 Margolis

homology of the Mùi algebra concentrates on even degrees. This is analog to the mod 2 Margolis homology of the Dickson algebra and the mod p Margolis homology of the Dickson-Mùi algebra, for p an odd prime.

7. Christian Ausoni (University Paris 13, France)

   Title: Algebraic K-theory of elliptic cohomology.

   This is joint work with G. Angelini-Knoll, D.L. Culver, E. Höning and J. Rognes.

   Abstract: In this talk, I will start with some motivations and recollections from stable homotopy theory, and then review the calculation of the mod (p, v_1, v_2) homotopy of the topological cyclic homology of the truncated Brown-Peterson spectrum of height 2, at primes $p \geq 7$. This computation is the first that exhibits chromatic redshift from pure v_2-periodicity to pure v_3-periodicity in a precise quantitative manner.

8. Antoine Touzé (University of Lille, France)

   Title: Functor homology over arbitrary rings.

   Abstract: Let $F(R, \Bbbk)$ denote the category of functors from free R-modules of finite rank to $\Bbbk$-vector spaces. After N. Kuhn, this category is also called the category of generic $\Bbbk$-linear representations of $GL(R)$. It is known that computations of Ext and Tor in this category are tightly related to the homology of $GL(R)$, which makes computations of Ext and Tor in this category is highly desirable.

   So far, computations were out of reach except when R is a finite field. In this talk, I will explain a new formula which gives access of Ext and Tor over arbitrary rings R. This formula expresses the result in terms of Hochschild Homology and generic homology of strict polynomial functors over $\Bbbk$, both of which are well understood.

   (This is joint work with A. Djament)