

basics of synthetic homotopy theory

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Following Lin-Wang-Xu section 3, I will introduce the HF2 synthetic homotopy category and some of its basic properties computationally.

synthetic Adams spectral sequence vs λ -Bockstein spectral sequences.

Yueshi Hou(侯悦石)

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In this talk, I will discuss the above two spectral sequences of various synthetic lifts of η^3 . In particular, the λ -Bockstein spectral sequence is always rigid, whereas the synthetic Adams spectral sequence always "looks like" the classical Adams spectral sequence in the bigraded diagram.

Hidden extensions in Adams E_r page

Shangjie Zhang(张尚杰)

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Following Lin-Wang-Xu section 2-5, I will introduce the extension spectral sequence and how it helps with defining hidden extensions in the classical Adams E_r page for $r \leq \infty$, focusing mainly on examples. I will also talk about the effect of a crossing of extensions, a situation we want to avoid in general to apply the generalized Leibniz rule and the generalized Mahowald trick.

the generalized Leibniz rule and the generalized Mahowald trick.

Yuchen Wu(吴雨宸)

University of California San Diego

Following Lin-Wang-Xu section 6, I will introduce the generalized Leibniz rule and the generalized Mahowald trick and how they help with concrete computations in practice.

Gaunce Lewis's work on Mackey Functors

David Andrew Victor White

Denison University

This talk will summarize what is known about the algebra of Mackey functor rings, including (projective/injective/flat/simple) modules, (prime/principal/maximal) ideals, the prime ideal spectrum, tensor products, discrete valuation rings, integral domains, division rings, fields, etc. In several places, additional care is required as compared to the classical ring-theory context. The main point of the talk will be to provide a road map to a book that Gaunce Lewis was writing when he died in 2006, that Peter May, Mike Hill, and I are working to finish in the near future. This book contains change of group results, change of ring results, induction results, and localization results. Lastly, if there is time, I will briefly discuss the connection to equivariant homotopy theory, via a bridge that shows which structures on equivariant ring spectra (and their modules) gives rise to the corresponding structure in Mackey functor algebra, including new results about ideals of equivariant ring spectra.

Towards the $K(2)$ -local homotopy groups of $RP^2 \wedge CP^2 \wedge HP^2$ at $p=2$

Sihao Ma(马思浩)

University of Notre Dame

A finite spectrum can be reassembled from its $K(n)$ -localizations. While the homotopy groups of the $K(2)$ -local sphere at the prime 2 have not been computed completely, there has been some progress on the computation of the $K(2)$ -local homotopy groups of finite spectra using the algebraic duality spectral sequence and the topological duality spectral sequence. In this talk, I will talk about the computation of the algebraic duality spectral sequence and the topological duality spectral sequence associated with $RP^2 \wedge CP^2 \wedge HP^2$.

Homotopical Beck monadicity and iterated loop space theory

Peter May

University of Chicago

I will give an overview of three papers in progress by Hana Jia Kong, Foling Zou, and myself. I will discuss the homotopical version of Beck monadicity for a pair of adjoint functors and the axiomatic refinement of this theory when given monads with special properties. Time permitting, I will also talk about applications using composite adjunctions to orbital presheaves and to multiplicative infinite loop space theory.

Mahowald invariant and its equivariant generalizations

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In this talk, I will review the classical Mahowald invariant and some of the computations and applications. The C_2 equivariant interpretation of Bruner-Greenlees allows us to define the generalized equivariant Mahowald invariant for larger groups. I will discuss some of the computations for the group C_{p^n} and their applications. This contains work joint with William Balderrama, Eva Belmont, Yueshi Hou, and Zhouli Xu.

The landscape of rational G-spectra for a compact Lie group G.

John Greenlees
University of Warwick

The talk will describe the general form of the category of rational G-spectra from two different points of view.

- (1) There is a precise description of the associated graded of a finite filtration, based on sheaves over the Balmer spectrum (joint work with S. Balchin and T. Barthel).
- (2) There is an approximate description of the assembled category: it is a product of blocks each dominated by a subgroup H. The block dominated by H is controlled by an integral representation of the finite group $\pi_0(H)$; to a first approximation it is a tensor product of pieces corresponding to the isotypical summands of the rationalization of the integral representation.

Equivariant Power Operations

Alexander Waugh
University of Washington

In this talk, I will introduce a general method for constructing stable operations which can be applied to the homotopy groups of any highly commutative G-spectrum which is a module over a fixed ring spectrum. Such operations are equivariant analogs of the classical Kudo-Araki-Dyer-Lashof operations. This construction recovers all of the operations in the case where the group of equivariance is trivial or has order two. Using this method, I will construct new nonzero operations for every finite group. This is joint work with Prasit Bhattacharya and Foling Zou.

Computing the Adams E₂-Page for Odd Primes

Yu Zhang(张宇)
Tianjin University

In this talk, I will present my ongoing joint work with Weinan Lin on algorithmic computations of the Adams spectral sequence E₂-page for odd primes. By developing a generalized Gröbner basis framework, we determine both the additive basis and complete multiplicative structure of the E₂-page in bounded inner degree ranges ($t \leq t_{\max}$).

A synthetic approach for differentials in equivariant slice spectral sequences

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The theory of synthetic spectra has led to significant breakthroughs in the computation of Adams-type spectral sequences. The formalism underlying these synthetic techniques is also applicable to the study of other spectral sequences arising from filtered spectra. In this talk, I will employ synthetic methods to compute some differentials in equivariant slice spectral sequences for the Hill—Hopkins—Ravenel theories.