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Enriched Hodge structures and cycles on analytic thickenings

Tuesday, 11 June 2024 16:00 (1 hour)

This talk is a report on an ongoing project with Madhav Nori and Deepam Patel. We consider triples (X, A, B) where X is a complex analytic space, A, B are closed analytic subspaces such that A is a proper algebraic variety, and X \ B is a complex manifold, and A \ B is a submanifold. We view this as defining a representative of a germ of an analytic neighbourhood of A (the "thickening"of A). If ι : A ⟶ X and j : X \ B ⟶ X are the inclusions, we may consider cohomology groups H^m(A, ι^(−1)Rj∗Z) (and Tate twists). Our goal is to define a variant of Deligne-Beilinson cohomology for such objects, using Enriched Hodge structures (Bloch-Srinivas), which are "enhanced"versions of Mixed Hodge structures. We expect that our "Enriched D-B Cohomologies" would be the targets of regulators defined on suitable K-groups associated to such germs, and these would detect interesting elements in the K-theory of the germs. An example is when X is a small ball around A = {0} in Cn, and B = ∅, which corresponds to the K-groups of the ring of convergent power series in n complex variables; here the underlying MHS has no information, while the "enriched"version has content. In this talk, we will indicate how the EHS's are constructed, what the corresponding Enriched DB-cohomology looks like, and discuss some simple examples.

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