

Weight Filtrations for Real Algebraic Varieties

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The talk is based on the joint work with Clint McCrory.

Session: 30. Real Algebraic Geometry, applications and related topics

For real algebraic varieties we define a functorial weight filtration on homologies with $\mathbb{Z}/2$ coefficients. This filtration is an analog of Deligne's weight filtration for complex algebraic varieties and can be defined on classical homologies and on Borel-Moore homologies. We show that the weight filtration on Borel-Moore homologies is induced by a geometric functorial filtration on the complex of semialgebraic chains with closed supports. The associated spectral sequence gives non-trivial additive invariants of real algebraic varieties, the virtual Betti numbers. These additive invariants are used to classify the singularities of real analytic function germs by method of motivic integration.