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Cohomology of Algebraic Varieties

Various cohomology theories have played a crucial part in the study of algebro-geometric objects since the birth of modern algebraic geometry in 1960s. Unlike in algebraic topology, not all cohomology theories in algebraic geometry are homotopy invariant, complicating the efforts of defining a good "homotopy category" of varieties, which would support all reasonable cohomology theories. For homotopy-invariant cohomology theories, Morel and Voevodsky constructed such a category in late 90s, which they referred to as A^1-homotopy category. Recently, there have been several attempts to define an analogous category that captures non-homotopy-invariant theories as well. We have been pursuing one candidate for such a category in joint work with R. Iwasa and M. Hoyois.