A new cohomology for algebraic varieties over non-achimedean fields (part II)

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Abstract:
The interplay between analytic geometry over non-archimedean fields and tropical geometry is a very active area with several applications in fields such as algebraic and arithmetic geometry. Recently, Hrushovski and Loeser introduced a model-theoretic account of the Berkovich's analytification of algebraic varieties: given a variety V over a non-archimedean field K, Hrushovski and Loeser associated to V the space \( \hat{V} \), the stable completion of V, and showed a very deep connection between V and the tropical semi-group \( \Gamma_{\infty} \) where \( \Gamma \) is the value group of K: there is a deformation retraction from \( \hat{V} \) to a definable subset of some finite power of \( \Gamma_{\infty} \). An analogous result was earlier proved by Berkovich for \( V^{an} \) under strong algebraic restrictions on the variety V. In this talk we report on the ongoing work (with P. Kovacsics and J. Ye) where we develop a sheaf cohomology theory for the spaces \( \hat{V} \). When the field K is maximally complete of rank one, the spaces \( \hat{V} \) and \( |V^{an}| \) are naturally homeomorphic and we recover results proved by Berkovich for the cohomology groups.