Perfectoid signature and an application to étale fundamental groups

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Abstract

In characteristic $p > 0$ commutative algebra, the F-signature measures how close a strongly F-regular ring is from being non-singular. Here F-regular singularities are a characteristic $p > 0$ analog of klt singularities. In this talk, using the perfectoidization of Bhatt-Scholze, we will introduce a mixed characteristic analog of F-signature. As an application, we show it can be used to provide an explicit upper bound on the size of the étale fundamental group of the regular locus of a BCM-regular singularities (related to results of Xu, Braun, Carvajal-Rojas, Tucker and others in characteristic zero and characteristic p). BCM-regular singularities (as introduced by Pérez-R.G. and Ma and myself) can be thought of as a mixed characteristic analog of klt and F-regular singularities from characteristic zero or $p > 0$ respectively. This is joint work with Hanlin Cai, Seungsu Lee, Linquan Ma and Kevin Tucker.

Keywords: F-regular rings, perfectoid, étale fundamental group.