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Tommy Lundemo
Radboud University

Log Hochschild homology via the log diagonal

Abstract: Log geometry is a variant of algebraic geometry in which mildly singular varieties can be treated as if they were smooth. Rognes has extended the definition of Hochschild homology to allow for log rings – the affine schemes of log geometry – as input.

As the Hochschild–Kostant–Rosenberg theorem relates Hochschild homology to the de Rham complex, one might expect a similar relationship between Rognes’ notion and the log de Rham complex. I will give a reformulation of Rognes’ definition which allows us to tackle this problem in much the same way as for ordinary Hochschild homology. In particular, this gives rise to a version of the HKR-theorem for algebras that are not necessarily smooth. This is based on joint work with Binda–Park–Østvær.

If time permits, I will discuss the analogous results for topological Hochschild homology, and explain why this theory is useful in the study of ramification in the context of structured ring spectra. This is related to work of Rognes–Sagave–Schlichtkrull, Höning–Richter, and myself.