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Towards a universal target for TQFTS

Abstract

As originally defined by Segal and Atiyah, n -dimensional topological quantum field theories (TQFTs) are functors from the “Bordism category”, whose objects are $(n-1)$ dimensional closed “space” manifolds and morphisms are n -dimensional “space-time” manifolds, to the category of finite-dimensional spaces and linear maps. It is now well understood that a good notion, which captures our intuitive understanding of locality, involves an extension of this notion to the “ n -category of n -manifolds with corners”. Lurie’s cobordism hypothesis concerns the classification of such functors in general target n -categories. However, the question of a universal target for TQFTs, extending the category of vector spaces and linear maps to some n -category (of algebras, higher algebras etc) is open. I will discuss progress towards constructing such a universal target, whose group of units is the homotopical version of the group of roots of unity (the Pontryagin dual of the sphere). This is joint work (in progress) with Dan Freed and Claudia Scheimbauer.