Bordered Floer homology over $\mathbb{Z}$

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Abstract

We develop a definition for bordered Floer homology over $\mathbb{Z}$ for bordered 3-manifolds with torus boundary and provide an explicit computational algorithm.

Using the notions developed by Ozsváth, Stipsicz, and Szabó to define a method of computing Heegaard Floer homology over $\mathbb{Z}$, we order and orient the curves of a bordered Heegaard diagram. We then use this extra data to construct sign assignments for both type A and type D structures over $\mathbb{Z}$, and show that these sign assignments are independent of the choices of order and orientation that we put on the Heegaard diagram in order to define them.

We further show that while these sign assignments fall into several equivalence classes, each class can still be paired with another to recover a function that satisfies the properties of a closed sign assignment as defined by Ozsváth, Stipsicz, and Szabó, albeit on a subset of the full domain used in their work. However, this function can be uniquely extended to a sign assignment on the full domain, and thus recovers Heegaard Floer homology over $\mathbb{Z}$.