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Matrix factorizations and homological mirror symmetry

Haijian Kevin Lin, UC Berkeley, USA

ABSTRACT

One version of the homological mirror symmetry conjecture states that the categories of *A*- and *B*-branes on a Fano manifold should be respectively equivalent to the categories of *B*- and *A*-branes on its mirror Landau-Ginzburg model, which consists of the data of an affine space together with a function W on that space.

To illustrate this claim, I will consider a very simple Fano manifold, namely $\mathbb{CP}^1$. The relevant category of *A*-branes is its Fukaya category, whose objects are given by Lagrangian submanifolds. Moreover, the category of *B*-branes on its mirror Landau-Ginzburg model corresponds to the categories of matrix factorizations associated to the singularities of the function W. I will sketch a proof of equivalence of these two categories in this simple special case.

Time permitting, I will discuss some further consequences and extensions of this version of homological mirror symmetry.