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Khovanov Homology from Mirror Symmetry

Abstract

Khovanov showed, more than 20 years ago, that there is a deeper theory underlying the Jones polynomial. The knot categorification problem is to find a uniform description of this theory, for all gauge groups, which originates from physics. I found two solutions to this problem, related by a version of two-dimensional homological mirror symmetry. They are based on two descriptions of the theory that lives on defects of the six-dimensional $(0,2)$ CFT, which are supported on a link times time. The theory turns out to be solvable explicitly.