Recent developments in mirror symmetry

David A. Cox
Department of Mathematics
Amherst College

Abstract

The talk will discuss two aspects of mirror symmetry: the enumerative meaning of instanton numbers for the quintic threefold, and some consequences of Givental's mirror theorem.

The instanton numbers n_d of the quintic threefold V are often thought of as "number of rational curves of degree d on V". This is a theorem for d at most 9, but for degree 10, I will explain why n_{10} is probably not the number of rational curves of degree 10 on V. The reason involves double covers of 6-nodal plane quintic curves on V.

The second part of the talk will give an example of what the Givental mirror theorem says about A-model and B-model correlation functions. I will consider a hypersurface of degree 8 in in P(1,1,2,2,2), whose resolution is a Calabi-Yau threefold with 2-dimensional Kähler moduli. We will see that the a full understanding Givental's theorem requires a conjectured compatibility between certain virtual fundamental classes.