

Why Markman's theorem saves the Hodge conjecture (for Weil type abelian fourfolds) from Kontsevich's tropical counterexamples

Patrick BROSINAN¹

¹ University of Maryland, USA

I'll explain what I know about two very interesting pieces of work:

(1) Markman's proof of the Hodge conjecture for Weil type abelian fourfolds of discriminant 1.

(2) Kontsevich's tropical approach to looking for counterexamples to the Hodge conjecture for Weil type abelian varieties.

Then I'll explain a simple observation of mine, which implies that Kontsevich's approach cannot work for abelian fourfolds of any discriminant.

I'll start out by explaining the statement of (1) precisely along with the geometric input that is required in (2). Then I'll formulate my observation, which is really about why the discriminant determines what types of degenerations an abelian fourfold of Weil type can have. Along the way, I'll take the opportunity to say a little bit about Markman's proof of (1).