Coskun, Izzet; Hyeon, Donghoon; Park, Junyoung

Castelnuovo-Mumford regularity and Bridgeland stability of points in the projective plane.
(English) Zbl 1388.14023

In this paper, the authors study the relation between Castelnuovo-Mumford regularity and Bridgeland stability for zero-dimensional subschemes of $\mathbb{P}^2$. The former is defined by an algebraic condition in terms of the degrees of the syzygies of the homogeneous ideal. The latter is a much more technical notion whose definition is omitted here. There is a distinguished half-plane $H = \{(s, t) \mid s > 0, t \in \mathbb{R}\}$ of Bridgeland stability conditions for $\mathbb{P}^2$. This leads to a nested set of semicircular “walls” $W_s$, ordered by inclusion.

Let $p_i$ be the maximal ideal of the closed point $p_i \in \mathbb{P}^2$, $i = 1, \ldots, s$. Let $Z$ be the subscheme given by $\bigcap_{i=1}^s p_i^{m_i}$ and let $n$ be its length. Let $h$ be the length of the largest collinear subscheme of $Z$. The main result of the paper is that if $n \leq 2h - 3$ then $Z$ is destabilized at the wall $W_{reg}(Z)-1$.

Reviewer: Juan C. Migliore (Notre Dame)

MSC:

14C05 Parametrization (Chow and Hilbert schemes)
13D02 Syzygies, resolutions, complexes and commutative rings
14D20 Algebraic moduli problems, moduli of vector bundles
13D99 Homological methods in commutative ring theory
14D99 Families, fibrations in algebraic geometry
14C99 Cycles and subschemes

Keywords:

Castelnuovo-Mumford regularity; Hilbert schemes of points; Bridgeland stability; monomial schemes

Full Text: DOI

References:

[12] Huizenga, Jack, Effective divisors on the Hilbert scheme of points in the plane and interpolation for stable bundles, J. Algebraic...

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.