

Public Abstract

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Title:A Transition Matrix for Two Bases of the Integral Cohomology of the Hilbert Scheme of Points in the Projective Plane.

This work is devoted to comparing two integral bases for the integral cohomology of the Hilbert scheme of points in the projective plane. Let  $X$  be a smooth complex projective surface. One of the more interesting moduli spaces parameterizing objects associated with  $X$  is the Hilbert scheme of points, which parameterizes all 0-dimensional closed subschemes of length  $n$  in  $X$ . W. Wang, Z. Qin and W.P. Li used Heisenberg algebra operators to construct an integral basis of the integral cohomology of the Hilbert scheme of points in  $X$  whenever  $X$  is a smooth projective surface with vanishing odd Betti numbers. On the other hand, a work by G. Ellingsrud and S.A. Stromme gives a cellular decomposition of the Hilbert scheme of points on the projective plane. From this work, we have a second integral basis for the integral cohomology of the Hilbert scheme of points in  $X$  when  $X$  is the projective plane. We compare the elements of these two bases and ultimately give the upper triangular transition matrix from one basis to the other.