

**Number theory and Representation
Theory seminar, Fall 2007
East Hall 4096
October 1, 3:10-5:00pm
(tea break at 4pm)**

Generic p-rank of semistable fibrations

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Abstract

Let k be a perfect field, X a proper smooth surface over k which admits a semistable fibration to a proper smooth curve C . If k is of characteristic 0, by the semi-positivity theorem the pushforward of $\omega_{X/C}$ to C does not have a quotient bundle of a negative degree. If k is of positive degree, this does not hold. In this talk, we will see the semi-positivity theorem holds if the generic fiber is ordinary and we will construct a surface of general type with smooth Picard scheme which violates the Miyaoka-Yau inequality, a counterexample of Parshin's expectation. We will also see if the base C is the projective line and the generic fiber the fibration has p-rank 0 then the pushforward of $\omega_{X/C}$ has a quotient bundle of negative degree. Using this, we can deduce that reductions of a non-closed point of a certain type in the moduli space of curves over a number field is outside the p-rank 0 strata for almost all places.