Effective computations of Hirono–Wells zeta function:

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Variation of Néron–Severi Ranks of Reductio of Ka Surfaces

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Abstract

We study the behavior of Néron–Severi rank and the variation of Néron–Severi rank in families of quartic equations. We also study the variation of Néron–Severi rank in families of surface equations.

Keywords: Néron–Severi rank, variation, quartic equations, surfaces.

On the classification of rational elliptic surface spectral series

by

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1. Introduction

We consider the problem of classifying rational elliptic surfaces with spectral series.

Let $S$ be a rational elliptic surface over $\mathbb{C}$. Let $\chi$ be its spectral series.

We denote by $\chi(S)$ the set of all rational elliptic surfaces $S'$ that are isomorphic to $S$.

For each $S' \in \chi(S)$, we define

$\chi(S)(n) = \sum_{S' \in \chi(S)} \delta_{n}(S')$

where $\delta_{n}(S')$ is the $n$-th coefficient of the spectral series of $S'$. Then, we can define

$\chi(S)(n) = \sum_{S' \in \chi(S)} \delta_{n}(S')$

Theorem 1: If $S$ is a rational elliptic surface, then

$\chi(S)(n) = \sum_{S' \in \chi(S)} \delta_{n}(S')$

$\chi(S)(n)$ is a polynomial in $n$ with rational coefficients.

Proof: We denote by $\delta_{n}(S')$ the $n$-th coefficient of the spectral series of $S'$. Then, we can define

$\chi(S)(n) = \sum_{S' \in \chi(S)} \delta_{n}(S')$

By the definition of $\delta_{n}(S')$, we have

$\chi(S)(n) = \sum_{S' \in \chi(S)} \delta_{n}(S')$

$\chi(S)(n)$ is a polynomial in $n$ with rational coefficients.

Corollary: If $S$ is a rational elliptic surface, then

$\chi(S)(n) = \sum_{S' \in \chi(S)} \delta_{n}(S')$

$\chi(S)(n)$ is a polynomial in $n$ with rational coefficients.

References


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