

# Even sets of $(-4)$ -curves on rational surfaces

Maria Marti

## Abstract

We study rational surfaces (i.e. birational to the projective plane) having an even set of disjoint  $(-4)$ -curves (rational curves with self-intersection  $-4$ ).

The question of the number of singularities of multiplicity 2, or equivalently  $(-2)$ -curves, on an algebraic surface is a very old one and this case was quite well understood, so our interest in this question arose because we wanted to know what could happen with other quotient singularities.

We prove that, contrarily to what happens for even sets of  $(-2)$ -curves, the number of curves in an even set of  $(-4)$ -curves is bounded. More precisely, the properties of the surface  $S$  obtained by considering the double cover branched on the even set are studied. It is shown that the number of curves in an even set of  $(-4)$ -curves is less or equal to 12. The surface  $S$  has always non-negative Kodaira dimension and the cases of Kodaira dimension zero and one are completely characterized. Several examples of this situation are given.