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# THE MODULI OF A CLASS OF RANK 2 VECTOR BUNDLES ON $P^3$

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## Introduction

Barth and others [1], [2], [5] have begun the study of stable algebraic vector bundles of rank 2 on projective space. Maruyama [7] has shown that stable rank 2 bundles have a variety of moduli which is the finite union of quasi-projective varieties.

The point of view taken here is to study a rank 2 vector bundle on $P = P_k^3$, $k$ an algebraically closed field, by looking at the zero sets of the global sections of the bundle. The zero set is a curve in $P$. A *skew bundle* on $P$ is a rank 2 bundle which has a global section whose zero set is a pair of skew lines. Skew bundles are precisely the stable rank 2 bundles with Chern classes (which we consider as integers) $c_1 = c_2 = 2$. This paper gives the explicit description of the moduli of skew bundles as an open subscheme in $P_k^5$. These bundles, see Remark 2.1.3, were among the first known examples of indecomposable vector bundles on $P$ [6, Section 10]. From a point of view different from the present one Barth [1, Section 7] has implicitly given the moduli of these bundles which he calls null-correlation bundles.

More precisely we do the following. A *skew bundle parametrized by a scheme* $T$ is a rank 2 vector bundle $E$ on $P_T^3$ such that the restrictions of $E$ to the fibres over geometric points of $T$ are skew bundles. For a locally noetherian scheme $T$ let $Sk(T) = \{E \mid E \text{ skew bundle parametrized by } T\}/\sim$, where $E_1 \sim E_2$ if there exists some isomorphism of $E_2$ and $E_1 \otimes_{P_T^3} L$ where $L$ is the pullback of a line bundle on $T$. If $g\colon T' \to T$ is a morphism and $E$ a skew bundle parametrized by $T$ then the pullback of $E$ to $P_{T'}^3$ is a skew bundle parametrized by $T'$. This gives a natural map $g^*\colon Sk(T) \to Sk(T')$. Clearly $Sk$ is a contravariant functor from the category of locally noetherian schemes to the category of sets. Our main theorem (Theorem

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