

On Vector Bundles on P^n Which Have σ -Transition Matrices

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0. Introduction.

When $n \geq 4$ and $n-1 \geq r \geq 2$, only few indecomposable vector bundles of rank r on n -dimensional projective space P^n are known. Some of them are very special vector bundles. That is, they have special system of transition matrices. In this article, we study such vector bundles which have special system of transition matrices, namely, system of σ -transition matrices.

In section 2, we give a general theory of a system of σ -transition matrices and its initial datum. Initial datum of a system of σ -transition matrices furnishes us with complete information about the system of σ -transition matrices.

In section 3, we give a theory of standard σ -matrix. Using a standard σ -matrix we can construct a system of σ -transition matrices and its initial datum.

In section 4, we give an example of standard σ -matrix which determines essentially the cotangent bundle Ω_{P^n} of P^n . And we give an example of initial datum of a system of σ -transition matrices, which determines the tangent bundle T_{P^n} of P^n .

In section 5, using the theory of system of σ -transition matrices, we reconstruct the Horrocks bundle of rank 3 on P^5 (cf. [3]).

In section 6, we reconstruct the vector bundle of rank 2 on P^5 which is given in [10] in characteristic two. Using the theory of system of σ -transition matrices, we give an example of non-constant morphism from P^5 to the Grassmann variety $Gr(5, 1)$ which parametrizes lines contained in P^5 . And we give an example of indecomposable vector bundle of rank 4 on P^5 which is essentially different from null-correlation bundle and the bundle given in [9].

In section 7, we give several remarks on vector bundles and matrices which appeared in sections 4, 5 and 6.

Recently, H. Kaji showed that the Horrocks-Mumford bundle, which is an indecomposable vector bundle of rank 2 on P^4 , has a system of σ -transition matrices