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Vector Bundles of Grassmann Type and Configuration Type of Rank 2 on an Algebraic Surface

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§0. Introduction.

The problem of constructing a holomorphic vector bundle of rank 2 on S having the given Chern classes, where S is a smooth projective surface over the complex number field $\boldsymbol{C}$, was first considered by Schwarzenberger ([17]) and solved by Maruyama ([11]). When $S=\boldsymbol{P}^2$, the structure of the moduli spaces are known (cf. [2], [7], [10], [13]). Many other important results are known (cf. [3], [6], [9], [12]). See [14] for general theory on $\boldsymbol{P}^n$. In the papers [15] and [16], Sasakura gave a method to construct vector bundles or reflexive sheaves of arbitrary ranks on complex spaces by giving explicit transition matrices and mentioned their general properties. They are called *of configuration type* or *of Grassmann type*. In this paper, we construct bundles of the above types of rank 2 on an algebraic surface and calculate their Chern classes by investigating the local structures.

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NOTATION AND TERMINOLOGIES. A surface means a complex manifold of dimension 2 embedded in a projective space. $\mathcal{O}$ denotes the structure sheaf of the surface which we concern. A vector bundle, or simply a bundle, means a holomorphic vector bundle of rank 2. A sheaf is simple if the endomorphisms of it are the homotheties. For a section s of a line bundle, $(s)_0$ denotes its zero divisor. For a meromorphic function t, $(t)_\infty$ denotes its pole divisor. Sometimes, we abbreviate the symbol $\otimes$ denoting the tensor product of sections: for example, $s_1 \cdots s_m := s_1 \otimes \cdots \otimes s_m$.

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