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WEIERSTRASS POINTS OF PRODUCTS OF RIEMANN SURFACES

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Ogawa has defined sets of Weierstrass points of a holomorphic vector bundle on a compact complex manifold. We generate nontrivial examples of such sets of Weierstrass points by considering the canonical bundle on a product of Riemann surfaces.

In the first section, we review Ogawa's definition and some classical facts about Weierstrass points on Riemann surfaces. In §2, we prove our theorems and consider an example to illustrate the proofs. Finally, we remark that a connection between Weierstrass points on a Riemann surface and fixed points of a periodic automorphism does not seem to extend to higher dimensions.

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1. Let M denote a connected, compact complex manifold of (complex) dimension n. Let E denote a holomorphic vector bundle on M of rank q. Let $J^k(E)$, $k = 0, 1, \cdots$, denote the holomorphic vector bundle of k-jets of E (cf. [7]). Put $R_k = \text{rank } J^k(E) = q \cdot (n+k)!/n!k!$. Suppose that $\Gamma(E)$, the vector space of global holomorphic sections of E, is of dimension $d > 0$. Consider the trivial bundle $M \times \Gamma(E)$ and the map

$$j_k : M \times \Gamma(E) \to J^k(E)$$

which at a point $P \in M$ takes a section to its k-jet at P. Put $\mu = \min(d, R_k)$.

DEFINITION. (cf. [6, 3]). For $1 \leqq r \leqq \mu$, let $W_k^r(E)$ denote the reduced closed analytic subspace of M defined by the vanishing of the exterior power $\Lambda^{\mu-r+1} j_k$.

The points of $W_k^r(E)$ are those $P \in M$ such that the rank of $j_{k,P}$ is at most $\mu - r$.

PROPOSITION 1. *Either $W_k^r(E)$ is empty or each component has codimension at most $r(|d - R_k| + r)$ in M.*

Proof. [2, Proposition 4].

Next, we need to review some facts from the classical theory of