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Holomorphic sections of a holomorphic family of Riemann surfaces induced by a certain Kodaira surface. (English) [Zbl 1192.14030](#)

Kodai Math. J. 32, No. 3, 450-470 (2009).

Let M be a two-dimensional complex manifold and B be a Riemann surface. One assumes that a proper holomorphic mapping $\pi : M \rightarrow B$ satisfies the following two conditions:

- (i) The Jacobi matrix of π has rank one at every point of M .
- (ii) The fiber $S_b = \pi^{-1}(b)$ over each point b of B is a closed Riemann surface of genus g_0 .

One calls such a triple (M, π, B) a *holomorphic family of closed Riemann surfaces* of genus g_0 over B .

A holomorphic mapping $s : B \rightarrow M$ is said to be a *holomorphic section* of a holomorphic family (M, π, B) of Riemann surfaces if $\pi \circ s$ is the identity mapping on B .

Let \mathcal{S} be the set of all holomorphic sections of (M, π, B) . Denote by $\#\mathcal{S}$ the number of all holomorphic sections of \mathcal{S} . Next result is called Mordell conjecture in the functional field case.

By *Yu. Manin*, [*Am. Math. Soc.*, Transl., II. Ser. 50, 189–234 (1966); translation from *Izv. Akad. Nauk SSSR, Ser. Mat.* 27, 1395–1440 (1963; [Zbl 0178.55102](#))], *H. Grauert* [*Publ. Math., Inst. Hautes Étud. Sci.* 25, 363–381 (1965; [Zbl 0137.40503](#))], *Y. Imayoshi* and *H. Shiga* [in: *Holomorphic functions and moduli II*, Proc. Workshop, Berkeley/Calif. 1986, Publ., Math. Sci. Res. Inst. 11, 207–219 (1988; [Zbl 0696.30044](#))], *J. Noguchi* [*Publ. Res. Inst. Math. Sci.* 21, 27–46 (1985; [Zbl 0583.32061](#))], one has:

Theorem 1.1. The number of all holomorphic sections of \mathcal{S} is finite.

In this paper, the authors consider a holomorphic family of closed Riemann surfaces of genus two which is constructed by *G. Riera* [*Duke Math. J.* 44, 291–304 (1977; [Zbl 0361.32014](#))]. The goal of this paper is to estimate the number of holomorphic sections of this family.

Reviewer: [Vasile Brînzănescu \(București\)](#)

MSC:

[14J15](#) Moduli, classification: analytic theory; relations with modular forms

[14J27](#) Elliptic surfaces, elliptic or Calabi-Yau fibrations

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