

**ON THE HYPERELLIPTIC RIEMANN SURFACES  
OF INFINITE GENUS WITH ABSOLUTELY  
CONVERGENT RIEMANN'S THETA  
FUNCTIONS**

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**Introduction**

The Riemann's theta functions associated with a closed Riemann surface are absolutely convergent. In the present paper, we shall show an example of an hyperelliptic Riemann surface  $\mathfrak{R}$  of infinite genus such that the Riemann's theta functions associated with  $\mathfrak{R}$  are absolutely convergent.

In §1, we shall formally define theta functions of countably many variables with rational characteristics in the same way as the usual theta functions of finite variables, and show the sufficient conditions under which these theta functions are absolutely convergent.

In §2, using the condition we shall really construct an hyperelliptic Riemann surface  $\mathfrak{R}$  of infinite genus such that the Riemann's theta functions associated with  $\mathfrak{R}$  are absolutely convergent.

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We shall freely use the following notations and conventions throughout the present paper;

$\Omega$ : the coordinate vector space consisting of all vectors with countably many components in the rational number field  $\mathbf{Q}$ , of which almost all components are zero,

$\Gamma$ : the subgroup of  $\Omega$  consisting of all the integral vectors,

$A = \Omega/\Gamma$ : the residue group of  $\Omega$  by  $\Gamma$ ,

$[\mathbf{a}] = [a_1, a_2, \dots]$ : the class of a vector  $\mathbf{a} = (a_1, a_2, \dots)$  in the residue group  $A$ .

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