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# Algebraic spectral curves from the viewpoint of automorphic forms

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Algebraic spectral curves are algebraic curves attached to ordinary differential equations. For example, the algebraic spectral curve attached to the classical Lamé equation is given by the Weierstrass equation  y^2=4 x^3-g_2 x-g_3vof an elliptic curve (Wallenberg, 1903). Algebraic spectral curves were originally studied by physicians. However, mathematicians applied them to differential geometry, integrable systems or algebraic geometry. For example, Shiota applied them effectively to solve a difficult problem in the theory of the moduli of algebraic curves, which is called the Schottky problem. Thus, algebraic spectral curves are really important in mathematics. By the way, the theory of automorphic forms is one of the most important theories among researchers in algebra. For example, appropriate special values of automorphic forms generate class fields (Kronecker's Jugendtraum). This provided a basis of the development of arithmetic geometry in the 20th century. Moreover, the solution of Fermat's last theorem (A. Wiles, 1995) is based on the theory of automorphic forms. Currently, many number theorists studied the Langlands programme, which gives sophisticated theory of automorphic forms. Here, g_2 and g_3 of the Weierstrass equation can be regarded as automorphic forms. So, the above example of Wallenberg suggests a non-trivial relation between algebraic spectral curves and automorphic forms. In this talk, the speaker will present a result to understand algebraic spectral curves from the viewpoint of automorphic forms. The Baker-Akhiezer function will connect automorphic forms and a certain type of differential equations.

## Biography

Atsuhira Nagano is a JSPS research fellow (PD) at Graduate School of Mathematical Sciences, University of Tokyo. His field of expertise is algebra. He is interested in the relation between algebraic varieties and automorphic forms. Especially, he gave a simple construction of Hilbert modular forms from period mappings of toric K3 hypersurfaces. Moreover, he gave simple models of Shimura curves and Shimura varieties in terms of periods of K3 surfaces and hypergeometric functions. His results are closely related to mirror symmetry of K3 surfaces. He is also interested in the application of spectral curves to number theory.

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