

Working with the zeta function of arithmetic surfaces

The zeta function of the function field of an arithmetic scheme was defined by Hasse in the 30ies and published in the 50ies; the general definition was given by Serre in the 60ies.

Despite their vast significance in arithmetic geometry until recently the zeta functions of arithmetic surfaces have not been studied directly. Typically one studies their L-factors instead.

Using new adelic spaces associated to arithmetic surfaces and a new translation invariant measure and integration on them one can extend the classical theory of Tate and Iwasawa and define and study the zeta integral of the surface and a character of the K_2 -adelic group associated to it via higher class field theory. This allows one to work directly with the zeta function of the surface and implies applications to three fundamental conjectures on the zeta functions of regular models of elliptic curves over global fields.