J. DIFFERENTIAL GEOMETRY
20 (1984) 55–119

SIGNATURE DEFECTS OF CUSPS OF HILBERT MODULAR VARIETIES AND VALUES OF L-SERIES AT $s = 1$

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0. Introduction

Investigating Hilbert modular surfaces, Hirzebruch found a very interesting relation between the signature defect associated to a cusp of a Hilbert modular surface and the value at $s = 1$ of a certain L-series [24, §3]. Hirzebruch's result is interesting since it gives a topological meaning to these values of L-series. However, Hirzebruch's proof is based on very explicit calculations and gives no deeper explanation of this connection between these topological and arithmetic invariants associated to a real quadratic field. He uses his beautiful explicit resolution of the cusp singularities of the compactified surface to compute the signature defect of the cusps. On the other hand, C. Meyer [28] has calculated the value at $s = 1$ of the corresponding L-series and it turns out that this value coincides with the formula for the signature defect of the cusp given by Hirzebruch. Guided by this result, Hirzebruch conjectured that for all Hilbert modular varieties associated with a totally real number field of arbitrary degree the signature defects of the cusp singularities are still given by values at $s = 1$ of certain L-series associated with the corresponding cusp [24, p. 230]. Actually, Hirzebruch's conjecture is more general. It is related to

Received August 18, 1983 and, in revised form, June 14, 1984.