

A formula for the Ihara zeta function of a partially directed graph involving an L^2 -determinant

We will give a quick introduction to the Ihara zeta function, which is a complex power series which was originally attached to a discrete subgroup of the group of rational points of $\mathrm{PGL}(2, F)$ where F is a non-archimedean local field, but was later realized to be capable of be viewed as attaching to finite graphs in general (the former case being viewed as a special case where the finite graph is a quotient of the Bruhat-Tits tree by the action of the discrete subgroup). Anton Deitmar has proved a formula for the Ihara zeta function of a locally constant sheaf of hermitian vector spaces over a finite graph, involving a quotient of a determinant over an L^2 -determinant of the combinatorial Laplacian. Combining this with work of Tarfulea and Perlis, we show how to generalize this to partially directed graphs.