

A trace formula for finite upper half planes

Anthony Shaheen

*Department of Mathematics, California State University, Los Angeles,
5151 State University Drive, Los Angeles, California 90032
e-mail: ashahee@calstatela.edu*

Communicated by: V. Kumar Murty

Received: November 4, 2005

Abstract. In this paper, we prove a trace formula for finite upper half planes H_q . A brief outline is as follows: Fix a subgroup $\Gamma \subset GL(2, \mathbb{F}_q)$. The adjacency operators A_a act on functions in $L^2(\Gamma \backslash H_q)$; thus, we may consider $A_a^\Gamma = A_a|_{L^2(\Gamma \backslash H_q)}$. We prove a trace formula which is an equality between a weighted sum of the traces of the operators A_a^Γ and a sum over the conjugacy classes of Γ . The trace formula allows us to compute the trace of A_a^Γ . We compute the trace formula for the subgroups $\Gamma = N$ and $\Gamma = K$ of $GL(2, \mathbb{F}_q)$.

2000 Mathematics Subject Classification: Primary 11T60;
Secondary 11F72.