

Computation of Maass cusp forms on modular group in Mathematica

ABSTRACT

Maass cusp forms of the Fuchsian group are eigenfunctions of the hyperbolic Laplacian representing bound states. It is known that the Maass cusp forms can only be solved numerically. The aim of this paper is to extend Hejhal's algorithm to compute Maass cusp form on the modular group $SL(2, \mathbb{R}) \backslash \mathbb{H}$ using Mathematica with the intent of exploiting its graphical and symbolic capabilities. We compute the eigenvalues of the Maass cusp forms employing a graphical scheme to locate the approximate value of the eigenvalue. We also plotted Maass cusp forms corresponding to selected eigenvalues.

Keyword: Maass cusp forms; Mathematica; Modular group