

Computing quantum bound states on triply punctured two-sphere surface

Abstract

We are interested in a quantum mechanical system on a triply punctured two-sphere surface with hyperbolic metric. The bound states on this system are described by the Maass cusp forms (MCFs) which are smooth square integrable eigenfunctions of the hyperbolic Laplacian. Their discrete eigenvalues and the MCF are not known analytically. We solve numerically using a modified Hejhal and Then algorithm, which is suitable to compute eigenvalues for a surface with more than one cusp. We report on the computational results of some lower-lying eigenvalues for the triply punctured surface as well as providing plots of the MCF using GridMathematica.

Keyword: Quantum mechanical system; Maass cusp forms; Computing quantum bound