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Spectral Functions on Teichmueller Space: Analysis and Computations

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I will briefly discuss two simple analytical estimates for eigenfunctions that allow to use computer algebra to establish eigenvalue inclusions and non-inclusions on hyperbolic surfaces within small intervals. It is then demonstrated how the spectral determinant and other values of the spectral Zeta functions can be computed to high accuracy for a given point in Teichmueller space. The implemented numerical algorithm is fast enough to investigate the behaviour of the spectral functions as functions on Teichmueller space. Other applications such as wave propagation in negative curvature and long time behavior of the geodesic flow is also discussed. If time allows I will demonstrate our free Fortran program that computes eigenvalues on genus 2 hyperbolic surfaces.

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