Minisymposium 21 - Automorphic forms and their applications

Hurwitz continued fractions and Ruelle's transfer operator

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We report a recent development concerning the transfer operator associated to a dynamical system. This is joint work with Dieter Mayer and Fredrik Strömberg (TU Clausthal). We present the well known Hurwitz continued fractions and the associated dynamical system. We present also a Ruelle transfer operator L_β for this dynamical system. The transfer operator L_β is related to the Selberg ζ-function associated to the geodesic flow on the modular surface $\mathrm{SL}_2(\mathbf{Z})\backslash\mathbf{H}$. Moreover, certain eigenfunctions of the transfer operator L_β have a cocycle interpretation. These cocycles are associated to Maass cusp forms using a theorem due to Bruggeman, Lewis and Zagier. Interestingly, all these connections between the stated areas in dynamical systems, ergodic theory and number theory also seem to hold for Hecke triangle groups. Finally, we present numerical calculations of the spectrum of the transfer operator for some selected Hecke triangle groups, pointing out the relation to Maass cusp forms.