

1042-28-110

Taryn C. Flock* (taryn.flock@yale.edu) and **Robert S. Strichartz.** *Laplacians on Julia Sets.* Preliminary report.

Let $P(z) = z^2 + c$ for c in the Mandelbrot set, and let J_c be the associated connected Julia Set. We study Laplacians (with numerical approximations to their spectra) on J_c that are naturally related to the dynamics of P . To create a Laplacian we need an energy and measure. In many cases there is a unique (up to a constant) P -invariant energy, obtained by pulling back the standard energy on the circle under the outer ray angle map. However, on the "Basilica" Julia set ($c=-1$) there is a 2-parameter family of energies invariant under $P \circ P$. There are two natural measures, the equilibrium measure ν and the conformal measure μ . If we use the P -invariant energy and equilibrium measure, we obtain a P -invariant Laplacian which depends only on the topological type of J_c (for example, on quasicircles it is equivalent to the ordinary Laplacian on the circle). This Laplacian on the basilica was recently studied by Rogers and Taplyaev . We give more details on the structure of its eigenfunctions and generalize the results to the "Douady Rabbit" ($c = -.122 + .745i$). (Received August 14, 2008)