The dynamics of mapping classes on surfaces

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Final Project

The final project of this course is due in 3 weeks (Friday February 17, 2012) in the "Report box" labeled Eriko Hironaka on the 3rd floor.

Please write a report relating to the contents of this course.

There are two approaches you can take for your report

Type I (Computational) Your report should include all of the following.

1. Description of a family of pseudo-Anosov mapping classes (E.g families of train tracks, Penner examples, Coxeter graph examples, etc.)
2. An explicit computation of dilatation as the house of a polynomial or eigenvalue of a matrix.
3. A qualitative description of the behavior of the dilatations in the family.

Type II (Qualitative) Answer one of the following:

1. Read Birman's paper (arXiv:1104.2873). Explain how subdivision of digraphs effects the characteristic polynomial.
2. Analyze some simple train track automata, starting for example with a polygon with n-vertices (n small) and number of "large" edges range from $n+1$ to $n+k$ (k small). (See, for example, (arXiv:math/0506295)).
3. Investigate what happens to $|\omega_\Gamma$ when you fix a mixed-sign Coxeter graph Γ, and attach tails. Let Γ_n be the result, when you attach some number of A_n to Γ at various vertices of Γ. Challenge: can you find an example such that $|\omega_{\Gamma_n}| \asymp \frac{1}{n}$?

If you have questions or have trouble accessing references, please write me at

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