

Readme for *Cell Splitter*

This JavaScript application illustrates the *cell of projective measured laminations* carried by a certain *train track* τ . A *train track* is a graph embedded on a surface with some additional smooth structure at the vertices. The edges are called *branches* and the vertices are called *switches*. In the case of our application the train track τ is embedded on a torus with two boundary components. Thus there are six branches A, B, C, D, E, F and four switches u, v, x, y . See Figure 1.

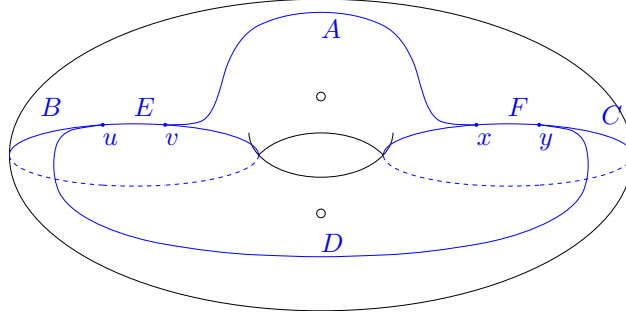


Figure 1: The train track τ (in blue) on a torus with two boundary components.

The triangle illustrated in the application is the *cell of projective measured laminations* carried by the train track τ . This cell is a polyhedron that parametrizes certain one-dimensional objects associated to τ . In particular, the vertices represent *curves*, i.e. embedded circles on the surface. Clicking on the triangle causes τ to undergo an operation called *splitting*. See Figure 2.

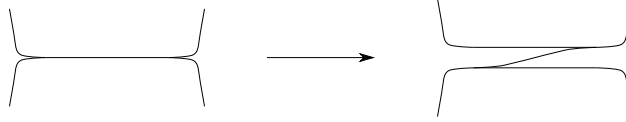


Figure 2: A split on a train track.

We split τ in all possible ways on its two *large* branches E and F . This yields four new train tracks σ . Each new train track has a cell of projective measured laminations. These four cells are the cells inside the triangle that you see after clicking. For each new train track σ there is a map from σ to τ which maps a branch of σ over some branches of τ . Hovering over a cell gives information about the corresponding train track σ . In particular:

- the *vertices* of the cell in projective coordinates;
- the branches of the train track σ and the branches of τ that they each map over;
- the switches of the train track σ and the branches that they are adjacent to in σ , on the left and on the right;
- the *transition matrix*, which records the number of times the branches of σ map over the various branches of τ .

In general, clicking on a cell causes the cell, and the corresponding train track, to split. All the vertices of all the cells represent curves. Hovering over any cell displays information about the train track. Here are some things you could play around with:

- What happens when you click on a point inside the triangle many times?
- What does the set of vertices (curves) look like after you split to make all the cells very small?

Happy clicking!

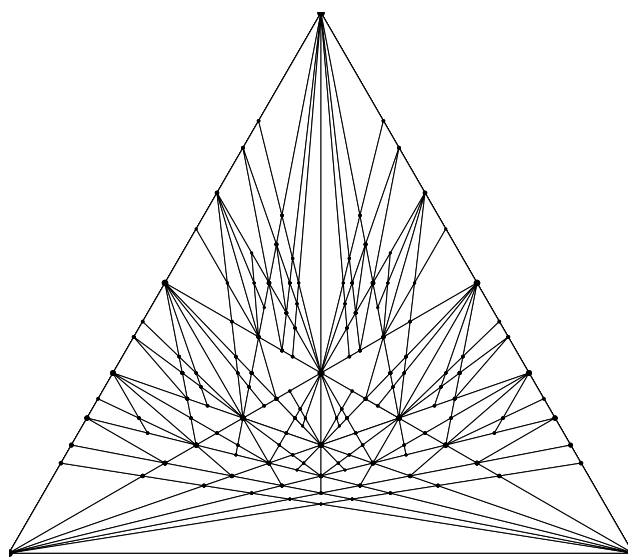


Figure 3: A few iterations of splitting.