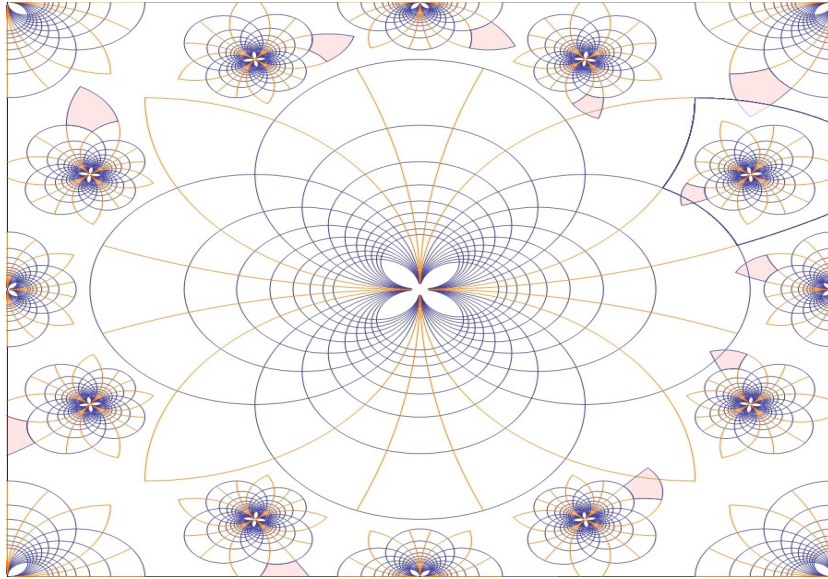


Fall 2017: Visualizing the Geometry of Continued Fractions

One way to write a number like pi is to specify a sequence of continued fractions that represent it. So pi would be approximated by 3, then by $3+1/7$, then by $3+1/(7+1/15)$ and so on. One can study continued fractions involving complex numbers as well, which leads to pictures like this:



Continued fractions have lots of great number-theoretic properties. Better yet, keeping track of the numerators and denominators leads to thinking about 2-by-2 matrices and then to hyperbolic geometry, which some times looks like this:

The goal of this project will be to illustrate the connection between hyperbolic geometry and continued fractions --- and then to see what new things we can prove about the two.

Students working on the project don't need to know anything about continued fractions or hyperbolic geometry, but should be ready to learn about both of those.

See <http://lukyanenko.net/projects.php>