Chenxi Wu

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Education and Employment

B. Sc. in Mathematics, Peking university. July 2010.
Ph.D in Mathematics, Cornell university. August 2016
Visitor at MSRI, August 2016-November 2016
Postdoc at MPIM, November 2016-

Selected Research Project

Detecting gene interactions through machine learning
Adapted various ML algorithms (additive groves, Lasso Linear Mixed Model etc.) to the task of detecting interactions between groups of features, and implemented a new statistical test for feature interaction based on xgboost (a gradient boosting library based on classification and regression trees). Used Python, C++ and R as the programming languages in different stages of the project.
Building pseudo-Anosov maps
Studied the dynamics of some 2-dimensional piecewise linear maps through numerical experiments written in C. Designed an algorithm for producing maps between closed flat surfaces from maps on interval, and implemented it in both Python (using SageMath) and C.
Calculation of the area of smallest triangles/virtual triangle on flat surfaces
As a part of the project, improved and implemented an algorithm described by my advisor with C++ and the numerical package Eigen.

Teaching and Outreach Experience

Graduate Teaching Assistant, fall 2012-spring 2016. Facilitate discussion sections, graded homework and exams, and designed quiz and practice problems for a variety of math courses.
Calculus Instructor, spring 2015. Taught Calculus I to about 30 undergraduate students.
Volunteer at Math Club of Ithaca High School, Fall 2011. Helped high school students preparing for math competitions.
Instructor of Math Explorer's Club, March 2016. Introduced some basics of differential geometry and topology to high school students.

Publications

The relative cohomology of abelian covers of the flat pillowcase. *Journal of Modern Dynamics*
Deloné property of the holonomy vectors of translation surfaces. *Israel Journal of Mathematics*
Constructing pseudo-Anosov maps with given dilatations. *Geometra Dedicata* (With Hyungryul Baik and Ahmad Rafiqi)
Lattice surfaces and smallest triangle. *Geometra Dedicata*

In preparation:
Approximations to infinite type pseudo-Anosov maps. (With Hyungryul Baik and Ahmad Rafiqi)
A Kazhdan-type theorem for metric graphs. (With Farbod Shokrieh)
Is a typical bi-Perron number a pseudo-Anosov dilatation? (With Hyungryul Baik and Ahmad Rafiqi)
A gene-based permuted extreme gradient boost method for detecting gene-gene interaction of qualitative traits. (With Hyungryul Baik and Ahmad Rafiqi)
Rotational component spaces for infinite-type translation surfaces. (With Lucien Clavier and Anja Randecker)

Technical Skills

C, Python, C++, LaTeX, Scipy, Numpy, Scikit-learn