Zhenyang Zhang

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Research Interests

Optimization, data-driven algorithm design, modeling and applied geometry.

Technical Skills ———

Proficient in Data Analytics, Optimization Algorithms and Statistical Modeling (Linear Regression, Time Series, Stochastic Process and Neural Networks).

Programming Languages ———

Python	● ● ● ● ●
R	● ● ● ● ●
Java	● ● ● ● ○
Matlab	● ● ● ● ○

Languages ———

🇬🇧	English	● ● ● ● ●
🇨🇳	Chinese	● ● ● ● ●
🇩🇪	German	● ● ○ ○ ○

Education

2017 – PhD expected: 2022	**Graduate Program in Math** Advisor: Jesús De Loera.	University of California, Davis
2013 – 2017	**B.A. in Applied Math and B.A. in Statistics** Dean's Honor List in Fa13, Sp14, Fa14, Sp15, Fa15 and Sp16. Research Advisors: David Aldous (Statistics), Yan Zhang (Combinatorics).	University of California, Berkeley

Working Experience

2021.6 – 2021.9	**Research assistant** Writing drafts for dynamic sharding strategies in TiDB. Helped building optimization models for strategies to migrate hot regions.	Pingcap Inc.

Research Experience

Conducted research on linear optimization and machine learning algorithms applied on the efficiency of it.

Following papers submitted for publication

2019	**Diameters of Cocircuit Graphs of Oriented Matroids: an update** *Collaboration with Ilan Adler, Jesús De Loera and Steven Klee*
	This paper studies open problems on the diameter of oriented matroids. Oriented matroids are combinatorial structures that generalize linear programs and have played a key role in the theory of linear optimization.
	Submitted to the Electronic Journal of Combinatorics
2020	**Enumerative problems for arborescences and monotone paths on polytopes** *Collaboration with Christos Athanasiadis and Jesús De Loera*
	We study the behavior of the simplex method. Every linear functional induces an orientation on the graph of a polytope. This paper discusses the maximum and minimum numbers of paths and an estimation of number of pivot rules on this directed graph.
	Journal of Graph Theory. https://doi.org/10.1002/jgt.22725
2021	**(Machine)Learning to Improve the Empirical Performance of Discrete Algorithms** *Collaboration with Imran Adham and Jesús De Loera*
	We improved the performance of two algorithmic case studies: the selection of a pivot rule for the Simplex method and the selection of an all-pair shortest paths algorithm. Multilayer perceptron and gradient boosted tree models were trained in these experiments.
	Submitted to CPAIOR

Invited Talks

May 2019	**Poster: "On the Diameter of Oriented Matroid Programs"** IPCO 2019 (Integer Programming and Combinatorial Optimization)	Ann Arbor, MI
Sep 2019	**"On the Diameter of Oriented Matroids"** Tenth Discrete Geometry and Algebraic Combinatorics Conference	South Padre Island, TX
Oct 2019	**"On the Diameter of Oriented Matroids"** American Mathematical Society Fall Eastern Sectional Meeting Special Session: Oriented Matroids and Related Topics	Binghamton, NY

Teaching Experience

2015, 2016	Undergraduate student instructor (TA) for Berkeley Math Department on Math 54 (Linear algebra) and Math 172 (Combinatorics)
2017–Now	Teaching Assistant for Davis Math Department on Calculus Series, Math 22A (Linear algebra) and Math 258A (Graduate Discrete Optimization)
Summer 2018	Associate Instructor for Math 21D (Multivariate Calculus). Fully in charge of writing syllabus, homeworks, exams and giving lectures.