Dylan Peifer

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BACKGROUND

Ph.D. in mathematics applying reinforcement learning to optimize heuristics in Gröbner basis computation, a key bottleneck in computer algebra. Experienced in mathematics, programming, data science, machine learning, quantitative finance, and options.

EDUCATION

Cornell University, Ithaca, NY
  Ph.D., Mathematics, expected May 2021
  M.S., Computer Science, December 2017, GPA 3.94
Carleton College, Northfield, MN
  B.A., Mathematics, June 2014, GPA 3.94

WORK

Susquehanna International Group, Bala Cynwyd, PA
  Quantitative Researcher Intern, Equity Options   June 2020 – August 2020
  Analyzed datasets of options transactions and developed models to predict stock prices based on signals in options markets.
The D. E. Shaw Group, New York City, NY
  Quantitative Analyst Intern, Options   May 2019 – August 2019
  Constructed features and trained machine learning models to predict options volume and trade direction.
Cornell University, Ithaca, NY
  Teaching Assistant, Mathematics Department   August 2014 – May 2020
  Taught sections, developed materials, and performed administrative duties for 600+ student courses in undergraduate multivariable calculus and linear algebra.

SKILLS

- Programming Languages: C, C++, Python, Scheme
- Mathematical Software: GAP, Macaulay2, Mathematica, MATLAB, Singular
- Python Packages: Cython, Matplotlib, NumPy, Pandas, Scikit-Learn, Seaborn, SciPy, StatsModels, SymPy, TensorFlow

SELECTED PUBLICATIONS

[1] Dylan Peifer, Michael Stillman, and Daniel Halpern-Leistner. Learning selection strategies in Buchberger's algorithm. In *Proceedings of the 37th International Conference on Machine Learning (ICML 2020)*.

[2] Dylan Peifer. An algorithm for enumerating difference sets. *Journal of Software for Algebra and Geometry* 9 (2019) 35-41.

[3] Omar A. AbuGhneim, Dylan Peifer, and Ken W. Smith. All $(96, 20, 4)$ difference sets and related structures. *Bulletin of the Institute of Combinatorics and its Applications* 85 (2019), 44-59.

SELECTED PROJECTS

DeepGroebner (https://github.com/dylanpeifer/deepgroebner) Applications of reinforcement learning to Gröbner basis computation using TensorFlow, SymPy, and Macaulay2. Used in publication [1] and still in active development.
DifSets (https://github.com/dylanpeifer/difsets) A refereed package for the system GAP that efficiently implements an exhaustive search for difference sets using group theory and dynamic programming. Presented in publication [2] and used in [3].