HARVARD UNIVERSITY
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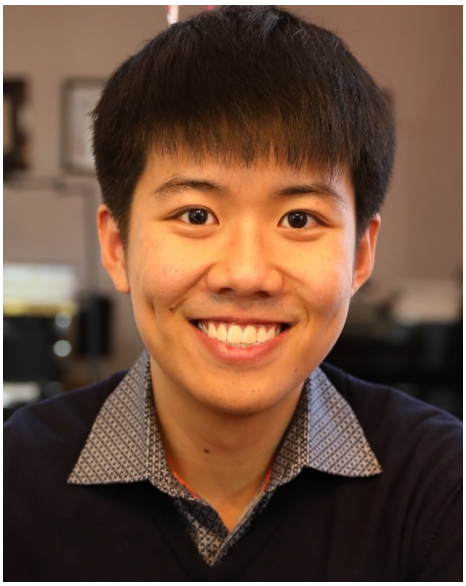
Mathematical Picture Language Seminar

Tuesday, May 10

9:30 a.m. Boston time



Learning Polynomial Transformations

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Abstract: Generative models like variational auto-encoders, generative adversarial networks, and flow-based models have exploded in popularity as extraordinarily effective ways of modeling real-world data. These models attempt to learn a parametric transformation of a simple, low-dimensional distribution into a complex, high-dimensional one. Yet, despite their immense practical impact, very little is known about the learnability of such distributions from a theoretical perspective.

This talk concerns arguably the most natural incarnation of this problem: given samples from the pushforward of the Gaussian under an unknown polynomial p: $\mathbb{R}^r \to \mathbb{R}^d$, can we approximately recover p (up to trivial symmetries)? I'll present the first polynomial-time algorithms for this task. These results leverage the sum-of-squares hierarchy, which has emerged from the theoretical computer science community in recent years as a powerful algorithmic tool for solving a number of high-dimensional statistical problems. I will also highlight an intriguing connection to tensor ring decomposition, a popular variant of the matrix product state ansatz. (Based on joint work with Jerry Li, Yuanzhi Li, and Anru Zhang.)

Zoom QR Code & Link:
https://harvard.zoom.us/j/77928335?pwd=MitXVm1pYUlJVzZqT3lwV2pCT1ZUQT09

https://mathpicture.fas.harvard.edu/seminar