

GRADUATE STUDENT SEMINAR

Guest Speaker: Minh Chieu Tran

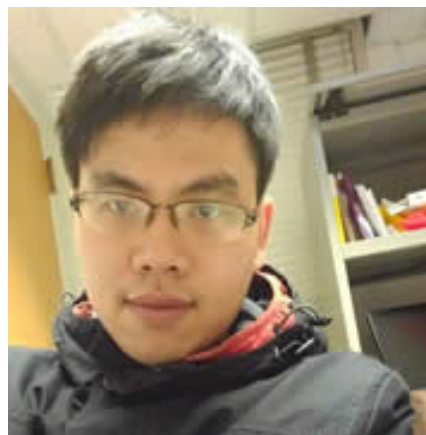
University of Notre Dame

Date: Thursday, February 24, 2022

Time: 2:00 PM

Location: 206 DeBartolo Hall

Zoom URL: notredame.zoom.us/j/93888654312



Lecture Title:

o-minimal method and generalized sum-product phenomena

Abstract

I will discuss a joint work with Yifan Jing and Souktik Roy where we show that for a polynomial $P(x, y) \in \mathbb{R}[x, y] \setminus (\mathbb{R}[x] \cup \mathbb{R}[y])$ to exhibit small expansion on a large finite set $A \subseteq \mathbb{R}$, we must have

$$P(x, y) = f(\gamma u(x) + \delta u(y)) \text{ or } P(x, y) = f(u^m(x)u^n(y))$$

for some $f, g, u \in \mathbb{R}[t] \setminus \mathbb{R}$, constants $\gamma, \delta \in \mathbb{R}^{\neq 0}$, and $m, n \in \mathbb{N}^{\geq 1}$. This yields an Elekes-Ronyai type structural result for symmetric nonexpanders, resolving a question mentioned by de Zeeuw. Our result uses o-minimal/semialgebraic geometric techniques to replace algebraic geometric techniques, which are only applicable to earlier known special cases.