LOW-DEGREE LEARNING AND FOURIER ANALYSIS

Speaker: Haonan Zhang
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Time：Mon, Dec. 15th, 09:30-10:30
Venue: Room 110, SCMS
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Abstract:

Fourier analysis methods play a powerful role in theoretical computer science and learning theory. The rapid development of quantum learning calls for Fourier analysis tools adapted to quantum systems. A recent breakthrough by Eskenazis and Ivanisvili on learning bounded low-degree functions over discrete hypercubes employs a family of dimension-free polynomial inequalities that trace back to the work of Bohnenblust and Hille in the 1930s. In this talk, I will review recent progress extending these results from discrete hypercubes to qubit systems. Further extensions to more general discrete quantum systems require new Fourier analysis inequalities on cyclic groups. Along the way, we discovered dimension-free discretization inequalities as unexpected byproducts.