



*Institute of Mathematical Research
Department of Mathematics*

Analysis Seminar

Higher decay inequalities for multilinear oscillatory integrals

Dr. Maxim Gilula
Michigan State University

Abstract

I will discuss the results and certain techniques in a recently accepted paper, coauthored with Philip T. Gressman and Lechao Xiao. It has been known for decades that the Newton polyhedron predicts optimal decay rates of oscillatory integrals, but there are very few results that have been proven due to a variety of difficulties. One of the most well known results for scalar oscillatory integrals, proven by Varchenko in 1976, gives the sharp decay rates for oscillatory integrals assuming a first order nondegeneracy condition on the phases under his consideration. Another result, due to Phong, Stein, and Sturm (PSS) in 2001, provides multilinear estimates related to the Newton polyhedron that are not sharp in the sense of decay rate, but are uniform over all polynomials of the same degree. The estimates of PSS only work in a very specific range of L^p spaces. Our result combines the two previous ones: we assume a second order nondegeneracy condition on real analytic phases in order to obtain estimates for the multilinear oscillatory integral operator studied by PSS. Our estimates do not preserve the uniformity of PSS, but do preserve the sharpness of decay rate discovered by Varchenko, and recover Varchenko's estimate as a special case. Moreover, our results hold in a wide range of L^p spaces that give a sharper decay rate than PSS in the few specific cases where our assumptions on the L^p spaces coincide with theirs.

Date: December 19, 2017 (Tuesday)

Time: 4:30 - 5:30pm

Venue: Room 210, Run Run Shaw Bldg., HKU