Level Set Operators vs. Oscillatory Integral Operators

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Abstract

Both oscillatory integral operators and level set operators appear naturally in the study of properties of degenerate Fourier integral operators (such as generalized Radon transforms). The properties of oscillatory integral operators have a longer history and are better understood. On the other hand, level set operators, while sharing many common characteristics with oscillatory integral operators, seem easier to handle.

We study $L2$ estimates on level set operators and compare them with what is known about oscillatory integral operators. The cases we consider include operators in one dimension with arbitrary smooth phase functions and level set version of Melrose-Taylor transform in two dimensions. Operators in higher dimensions are considered as well. The estimates are formulated in terms of the Newton polyhedra and type conditions.

This is a joint work with Svetlana Roudenko, Duke University.