DIFFERENTIAL GEOMETRY/PDE SEMINAR

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Fourier transforms, hyperfunctions and second microlocalization

Otto Liess
(University of Bologna, Italy)

We define at first the Fourier-inverse transform of infra-exponentially increasing functions on R^n or C^n. Hyperfunctions can be understood in this setting in terms of Dolbeault-(de Rham)-cohomology classes, rather than in terms of the relative-cohomology classes used in the initial definitions of Sato. As a consequence we can develop a new approach to hyperfunctions and to analytic microlocalization. In this frame the Fourier-inverse transform is the analytic tool to relate the geometric approach to analytic microlocalization of Sato to the analytic approach of Hörmander. We illustrate this with some examples, to turn attention then to a "local" form of the Fourier transform which is defined only locally and is sharp only molduloreal-analytic functions. The motivation for our results comes from higher microlocalization and in the final part of the talk I would like to explain some sharp forms of the edge- of-the-wedge theorem which are related to the results mentioned above and which are needed if one wants to develop a theory of the Fourier-transform for higher microlocalization in hyperfunctions.