Instituto de Ingeniería Matemática y Computacional

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MICROLOCAL DEFECT FUNCTIONALS: H-DISTRIBUTIONS

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Abstract

Microlocal defect functionals (H-measures, H-distributions, semiclassical/Wigner measures, etc.) are objects which determine, in some sense, the lack of strong compactness for weakly convergent L^p sequences.

H-measures, in contrast to the semiclassical measures, are not suitable to treat problems with a characteristic length (e.g. thickness of a plate), while more recent variants, one-scale H-measures, are the extension of both H-measures and semiclassical measures. However, both of these objects are applicable only to L^2 framework.

H-distributions are an extension of H-measures to the L^p–L^q setting, and so far they have been successfully applied in compactness by compensation theory with discont nuous coefficients and to velocity averaging. For their construction, the Plancherel theorem (which was sufficient for H-measures) had to be replaced by Hörmander-Mihlin's theorem for Fourier multipliers. In order to broaden their possible applicability one needs to develop some additional properties of H-distributions. In this, an appropriate variant of the Schwartz kernel theorem is crucial: it allows to identify a bilinear form on the space of test functions with a distribution of finite order in both variables; in fact, being a Radon measure in the physical x space, and the distribution of finite order in the dual ξ space. This line of research will hopefully lead to a tool suitable for treating multiscale problems.

SEMINARIO

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