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Short course on H-mesures and variants by Nenad Antonic

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Abstract:

Weak convergences are the foundation of most successful methods in the investigation of partial differential equations today. The approach known as Tartar's programme proved particularly convenient for partial differential equations modelling physical laws; the basic assumption being that weak convergences of sequences of solutions model the transition from microscale to macroscale. We are particularly interested in mathematical objects being, in a generalised sense, accumulation points of weakly convergent sequences, such as defect measures or H-measures. H-measures are a microlocal analysis tool which has successfully been applied in a variety of applied analysis problems: in small amplitude homogenisation, in the theory of microstructure (problems with two or more potential wells), in the study of propagation of oscillations and microlocal energy, in controllability of partial differential equations, etc. The original H-measures are suited for the treatment of hyperbolic problems. Recently, different variants of the concept have been introduced, first allowing extension of the results to parabolic type problems, and later to problems of more general type. Another successful application of H-measures is in the velocity averaging theory, as they enable generalisation of results obtained for constant coefficients (the homogeneous setting) to variable ones (the heterogeneous setting). First results of this kind are found in for hyperbolic problems, while recent development of variant H-measures enabled generalisations to problems of various types, including other linear and even fractional differential equations. The notion of H-measures is given in the L2 framework, and the above results are constrained to solutions bounded in Lp, p≥2. By developing and applying appropriate tools, named H-distributions, applications outside the L2 framework are also possible. Quite often, the nature of the problem requires a particular variant to be developed, prompting further research in constructing new objects.

15h00 to 17h00 – room 6.2.42

18 | April (monday) **21 | April** (thursday) **22 | April** (friday)

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Local: Departamento de Matemática,C6 – Piso 2