

Thursday, January 16th, 12:00-13:00

Seminar Room at the Mathematics Department of UPV/EHU

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AN ANALYTIC-ALGEBRAIC APPROACH TO LINEAR RESPONSE THEORY

Linear response theory (LRT) is a tool which allows the study of the response of systems that are driven out of equilibrium by external perturbations. In this talk I present a systematic approach to LRT by combining analytic and algebraic ideas. The theory is robust and provides a tool to implement LRT for a wide class of systems like periodic and random systems in the discrete and the continuum. The mathematical framework of the theory is outlined firstly: the relevant von Neumann algebras, non-commutative L^p - and Sobolev spaces are introduced; the notion of isospectral perturbations and the associated dynamics and commutators are studied; their construction is then made explicit for various physical systems (quantum systems, classical waves). The final part is dedicated to the presentation of some open problems (e.g. the thermal transport).

Joint work with M. Lein.