Departamento de Matemática Aplicada



CONFERENCIA MARTES 26 DE SEPTIEMBRE DE 2023 A LAS 11:30

Multiplier theorems for causal translation-invariant operators with applications to control theoretic input-output stability

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We discuss a Laplace multiplier theorem for causal translation-invariant linear operators which provides a characterization of continuity from $H^{\alpha}(\mathbb{R})$ to $H^{\beta}(\mathbb{R})$ (fractional Sobolev spaces, $\alpha, \beta \in \mathbb{R}$) in terms of a certain boundedness property of the transfer function (or symbol), a holomorphic function on the right-half of the complex plane. We identify sufficient conditions under which this boundedness property is equivalent to a similar property of the boundary function of the transfer function. It will be shown how the Laplace multiplier theorem can be used to derive a corresponding Fourier multiplier theorem. Furthermore, we provide an application to mathematical control theory, by developing a novel input-output stability concept for a large class of causal translation-invariant linear operators which refines existing input-output stability theories. Finally, it will be indicated how the results extend to vector-valued functions and links to polynomial stability theorems for strongly continuous operator semigroups on Hilbert spaces will be highlighted.

Knowledge of mathematical control theory is not required in order to understand the presentation: only very few control theoretic concepts will be required and they will be introduced in the talk.

Lugar: Aula Luis Rodríguez Marín del Departamento de Matemática Aplicada de la UNED (Aula 2.32). E.T.S.I. Industriales.