

Trace regularity for time-fractional evolution equations

Daniela Sforza

Sapienza Università di Roma
email: daniela.sforza@uniroma1.it

Abstract

Nowadays, scientists recognize that complex systems and phenomena involving long range memory effects are successfully described by integro-differential equations. Such well-known physical phenomena and processes comprehend fractional viscoelasticity, spatial and frequency dispersion of power type, non exponential relaxation, anomalous diffusion, and many others.

This talk focuses on some features concerning the hidden regularity for weak solutions of evolution equations with memory. In control theory, hidden regularity is a consequence of the direct inequality, a fundamental step to establish exact controllability for distributed systems. We deal with different types of integro-differential equations, depending on the level of regularity assigned to the term expressing the memory. We usually consider regular kernels or singular integrable kernels. Typical for the latter case is the power-law memory, that leads to time-fractional differential equations. We carry out the task of proving hidden regularity results by using the multiplier method and the peculiar techniques of interpolation theory.

This is a joint work with Paola Loreti (Sapienza Università di Roma).