The control theory within the framework of the theory of regularization of ill posed problems.

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The aim of the present talk is to present another theoretical scheme to study the problems of control theory in the framework of the theory of ill posed problems (inverse problems) instead of the classical approach of solving an optimization problem for a functional objective with differential restrictions.

In effect, solving a control problem is equivalent to solving an ill posed equation in the Hadamard sense for an operator defined between two convenient Hilbert spaces.

In this way, the solution to the problem depends on the construction of a "regularization scheme". We show the advantage in the practice of this type of approach when regularization schemes are introduced such as the one known as "approximate solutions method" and the recently created by the author "admissible data method" which is an optimal scheme in a sense that we will specify in the talk. Both schemes will be explained as part of the talk.

These methods allow solving a wider range of optimization problems with differential constraints than those that arise in control theory, such as the problems of identification of coefficients, sources, boundary conditions and unknown boundaries, which appear in different types of tomography or in the inverse problems of the potential theory.

References:

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2. Eduardo Hernandez-Montero, Andres Fraguela-Collar and Jacques Henry, An optimal quasi solution for the Cauchy problem for Laplace equation in the framework of inverse ECG, HAL Id: hal-01933948 https://hal.inria.fr/hal-01933948 (Submitted on 24 Nov 2018) Accepted for publication in “Mathematical Modelling of Natural Phenomena”.