UNIVERSITÀ CATTOLICA del Sacro Cuore

Dipartimento di Matematica per le Scienze economiche, finanziarie ed attuariali

Nell'ambito delle iniziative seminariali del Dipartimento, rivolte alla ricerca ed alla didattica avanzata,

giovedì 12 gennaio 2023, alle ore 11:30

si svolgerà il **SEMINARIO**

« On the extension of Calculus of Variations and Optimal Control to multiple objectives (by Alberto Lovison and Franco Cardin)»

a cura del

Prof. Alberto Lovison
Politecnico di Milano

Abstract: In this talk we will illustrate some real world problems where optimization is the tradeoff between two or more objective functionals. We will illustrate how such tradeoff with variable weights realizes a parametric family of solution curves. This allows for solving inverse problems in the following sense: if a physical or natural process generates a family of different solutions, one can infer information on the objective functions optimized in tradeoff, gaining relevant insights in the process studied.
Among the applications we consider the case of the xylematic counduits, i.e., the micron scaled tubes transporting the water inside vascular plants. We observe how the diversity in the realizations of such conduits can be ascribed to a variety of possible tradeoffs between two very natural objectives: maximize the transported water while minimizing the construction costs due to carbon consuption.
Finally we consider optimal control with respect to several objectives at the same time, and explore a possible reformulation of the Pontriagyn Maximum Principle, which is named Pareto-Pontryagin MP. The dyamical version of the origin of the xylematic conduits considered for CdV is revisited as an optimal control problem.

Tutti gli interessati sono invitati a partecipare.