

# First Joint Meeting Brazil Italy of Mathematics

## Special Session: Optimal Control

Rio de Janeiro, August 29 - September 02, 2016

**Title:** On second order necessary conditions in Optimal Control

**Authors:** H el ene Frankowska and Daniela Tonon

**Abstract:** This talk is devoted to second order necessary optimality conditions for the Mayer optimal control problem when the control set is a closed subset of  $\mathbb{R}^n$  and endpoint constraints are present. Admissible controls are supposed to be just measurable. We show how to exploit the properties of particular second order variations, obtained using the adjacent tangent cone and the second order adjacent tangent subset to the control constraint, in order to obtain several different formulations of second order necessary conditions in integral form. These second order necessary conditions are then applied to obtain Goh condition, a pointwise second order necessary optimality condition which turns out to be useful when the optimal control for the Mayer problem is singular, i.e. when the classical Legendre-Clebsch condition is no more of use.