Numerical methods for Optimal Control

A mini-symposium organized by:

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Optimal control emerged as a field of research in the 1950s in response to aerospace problems. The goal of optimal control is to find a control law for a given system such that a certain optimality criterion is attained.
Most of the problems, specially the nonlinear ones, cannot be solved analytically, only numerically. Several methodologies have been developed to numerically solve optimal control problems, which can be categorized into:

- Dynamic programming / Hamilton Jacobi based methods;
- Indirect methods based on applying necessary conditions of optimality in the form of the Maximal Principle and then solve the resulting boundary value problem;
- Direct methods which rely on the discretization, transcription and then the solution of the generated nonlinear programming problems.

Nowadays, optimal control is a recognized tool, known by its impact, efficacy and widespread application in different areas, such as robotics, automotive, biological systems, health problems, economic problems, energy problems, agriculture problems.
Not surprisingly, new numerical tools have been recently developed and integrated into widely distributed software packages, such as: Bocop, ICLOCS, CasADi, ACADO, GPOPS among others. Other relevant tools to characterize and find the solution to optimal control problems include modelling, analysis, applications, efficient ways to integrate or simulate the dynamic equations.

This mini-symposium aims to bring together researchers who contribute in this active field.