**Code generated integrators for fast optimal control**

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Abstract:

Algorithms for real-time, embedded optimization need to run within tight computational times, and preferably on embedded control hardware for which only limited computational power and memory is available. A computationally demanding step of shooting methods is often the model simulation with sensitivity generation. This talk presents an implementation of code generation for Implicit Runge-Kutta (IRK) methods with efficient sensitivity generation, which outperforms other solvers for the targeted applications.

The focus of the talk will be on the support for index-1 Differential Algebraic Equations (DAE) and continuous output functions, which are crucial for e.g. performing sensor fusion with measurements provided at very high sampling rates. In addition, the exploitation of specific structures in a typical nonlinear model will be discussed briefly. The new tool is provided with a powerful MATLAB interface. Its performance and ease of use will be illustrated, using some interesting examples from the literature.