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## Solving optimal control problems with Julia

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J.-B. Caillaud, O. Cots, J. Gergaud, P. Martinon, S. Sed The numerical solution of optimal control of dynamical systems is a rich process that typically involves modelling, optimisation, differential equations (most notably Hamiltonian ones), nonlinear equations (e.g. for shooting), pathfollowing methods...and, at every step, automatic differentiation. While tremendous efforts are being made in every one of the above-mentioned fields by the Julia community, there are still some missing parts to bridge the gap between them and have a fully satisfactory solving process - meaning: an abstract description, as close as possible to the mathematical problem formulation, and an efficient & reliable numerical computation. The Julia language has a lot to offer in this respect, and there already are excellent codes available [1, 2, 3, 4], while mostly oriented towards « direct solving » (that is direct transcription of the original optimal control problem into a mathematical program). We report on recent experiments with the Julia package OptimalControl from [5] on a variety of applied or more theoretical problems. 1. ControlSystems 2. InfiniteOpt 3. TrajectoryOptimization 4. Enzyme 5. control-toolbox

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