

## Master Thesis / Student Researcher Position

### dco/matlab: Differentiating MATLAB code based on dco/c++

**Description:** Algorithmic differentiation is a program transformation technique for the automatic generation of *adjoint codes* for a given numerical simulation program. Adjoint codes play a crucial role in sensitivity analysis and optimization, since they deliver derivatives of computed outputs with respect to parameters in a runtime which is a constant multiple of the runtime of the original program. Sensitivity information reveal highly desirable properties of the underlying system, see for example the figure on the right.

**Goal:** In our team, you will develop a MATLAB overloading tool implementing algorithmic differentiation techniques. To get efficient MATLAB code one usually uses C/C++ as backend. Therefore, dco/matlab needs to support and exploit this as well (dco stands for *derivative code by overloading*). The approach in this thesis is to use dco/c++ as backend to dco/matlab.

**Profile:** You should know C/C++ as well as MATLAB and keen to use modern features (e.g. C++14). In addition, knowledge in the field of numerical simulation and optimization is advantageous.

If you are interested in a master thesis or a student researcher position (up to 19 hours a week) on this topic, please do not hesitate to contact us!

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