Software and Tools for Computational Engineering
RWTH AACHEN UNIVERSITY
Software and Tools for Computational Engineering
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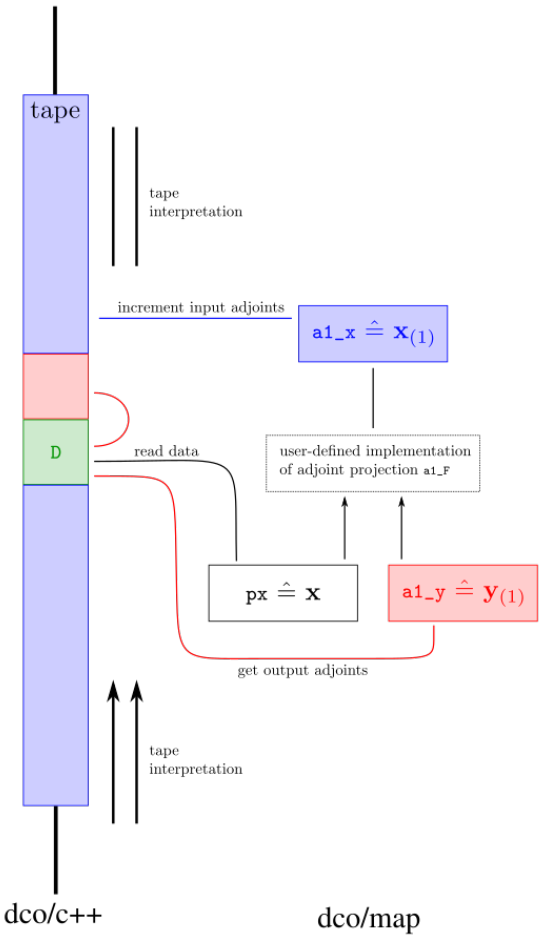
Master Thesis / Student Researcher Position

Coupling `dco/c++` with `dco/map`: Run Time and Compile Time Adjoints with C++14

Description: Adjoint code development for many-core architectures like GPUs is a major challenge. To address issues arising from the parallelization, currently hand-writing the adjoint code is the most promising approach. Unfortunatly, hand-writing has the fundamental drawback of maintainability, i.e. diverging primal and adjoint codes. To overcome this, supporting tools can and should be used. At our insititut, we developed new approach for generating adjoint C++ codes by algorithmic differentiation. The approach is called *meta adjoint programming* and based on the template metaprogramming mechanism. With new developments in the C++ language standard, operator and function overloading techniques can be used to achieve efficient and maintainable adjoint codes.



Goal: In this thesis, a seamless integration of `dco/map` into `dco/c++` is to be developed. This includes design of a new interface compliant with C++11 and beyond as well as the development of compatible data layouts.

Profile: You should be familiar with C++ and template metaprogramming. In addition, knowledge in the field of numerical simulation and optimization is beneficial.

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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