

Type Inferencing and Python to Modelica Translation

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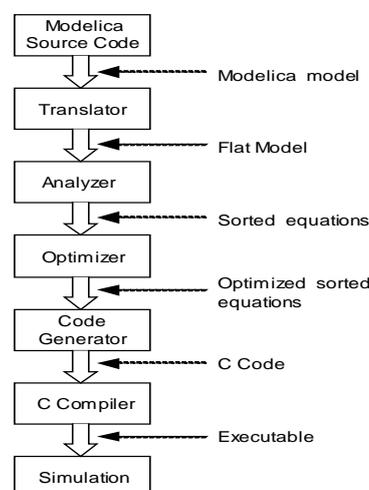
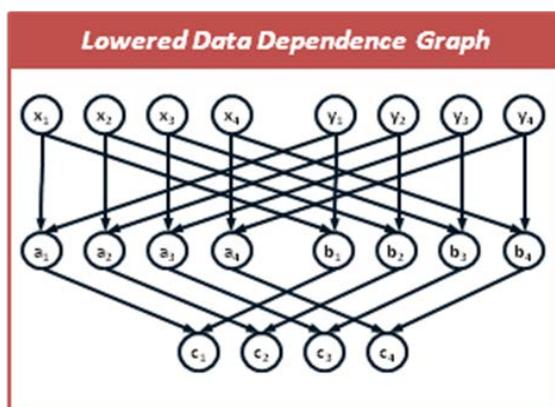
PELAB – Programming Environment Lab, Institutionen för Datavetenskap
www.openmodelica.org

At PELAB, together with the Open Source Modelica Consortium (an international open source effort supported by 45 organizations, see www.openmodelica.org) the OpenModelica environment including the OpenModelica Compiler (OMC) of the Modelica language including MetaModelica extensions is developed. Modelica is a high level language supporting equations and matrix operation. The development is open source.

Python is a common dynamically typed language used for scientific computing including matrix computation whereas Modelica is a statically strongly typed language for equation-based modeling, scientific computing and matrix computations.

The goal of this master thesis project is to design and implement a Python to Modelica translator including type inferencing techniques to infer types in dynamically typed Python programs to be used in statically typed Modelica programs. This also includes inferencing shapes of array types. The goal is to be able to call translated Python programs from Modelica. The implementation approach can with a high probability be built on the MetaModelica [2] and OMCCp [1] systems. OMCCp provides a parser generator for writing the Python parser, whereas MetaModelica provides abstract syntax tree pattern matching and transformation, as well as a built-in type inference routine which probably will need to be extended.

The master thesis project requires knowledge and interest in compiler construction and advanced programming.



References:

- [1] Edgar Alonso Lopez-Rojas. OMCCp: A MetaModelica based parser generator applied to Modelica. Master's thesis, Linköping University, Department of Computer and Information Science, May 2011. <http://liu.diva-portal.org/smash/record.jsf?pid=diva2:421575>
- [2] Peter Fritzon, Adrian Pop, and Martin Sjölund. Towards Modelica 4 Meta-Programming and Language Modeling with MetaModelica 2.0. Technical reports in Computer and Information Science, No 10, Linköping University Electronic Press, <http://www.ep.liu.se/PubList/Default.aspx?SeriesID=2550>, February 2011
- [3] Peter Fritzon, et al. OpenModelica 1.9.0 Users Guide, October 2012, <http://www.openmodelica.org/index.php/home/userdocumentation>.
- [4] Python, Python programming and references. Url: www.python.org