Tabulation of Chemical Source Terms for Turbulent Combustion Simulations

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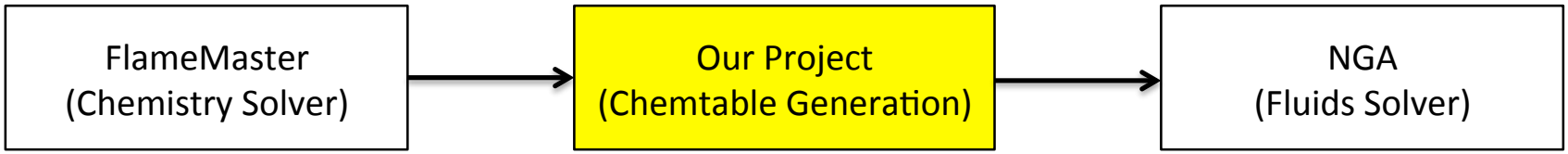
Introduction

Flamelet Modeling for Tubulent Combustion Simulations:



Key Data Processing Capabilities:

- Sorting
- Monotonicity checking
- Convolution
- Interpolation

SWIG is used to interface C++ and Python.
Git is used for version control.
Doxygen is used for documentation.
Python Unittest is used for automated testing.

Progress Variable

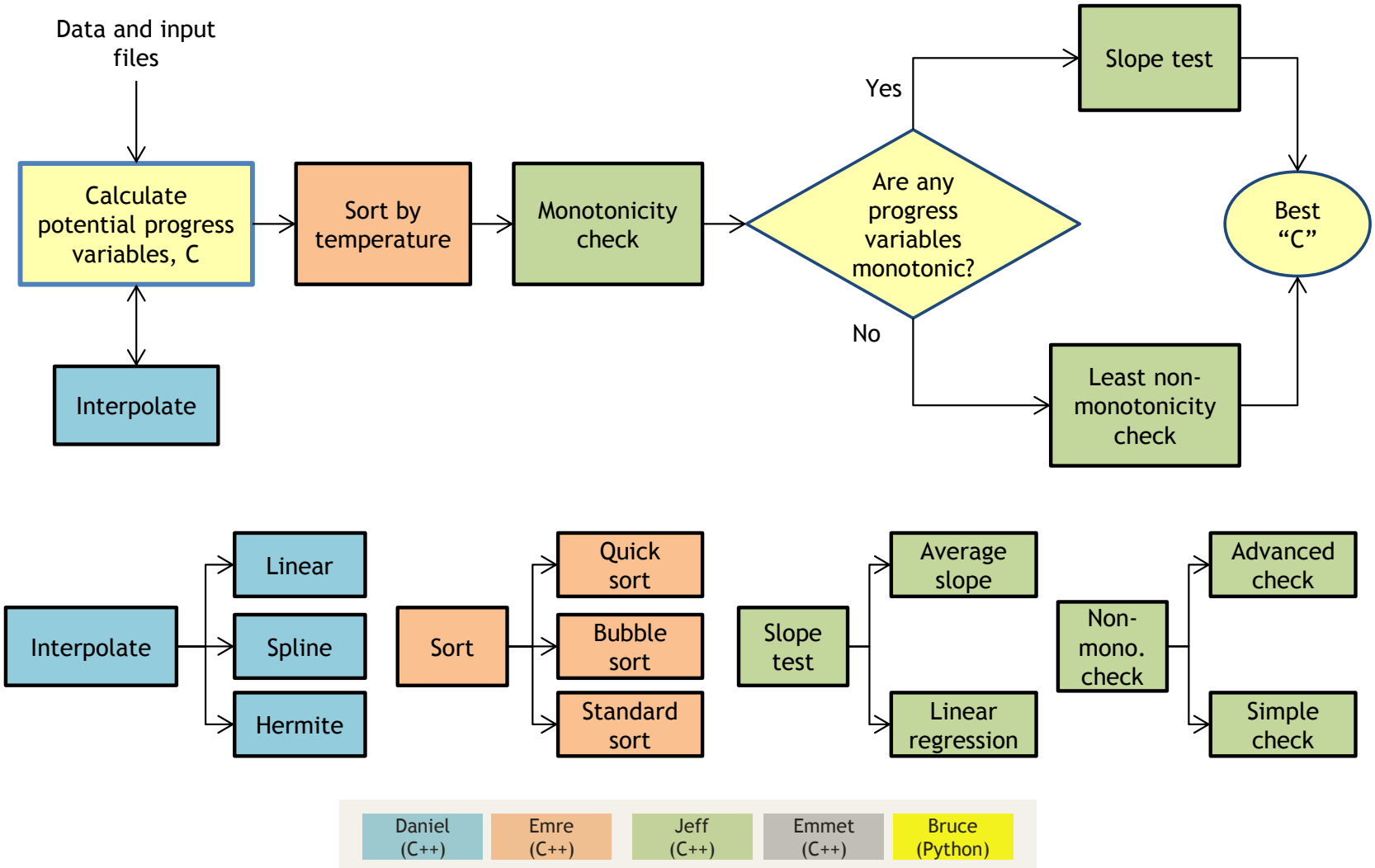
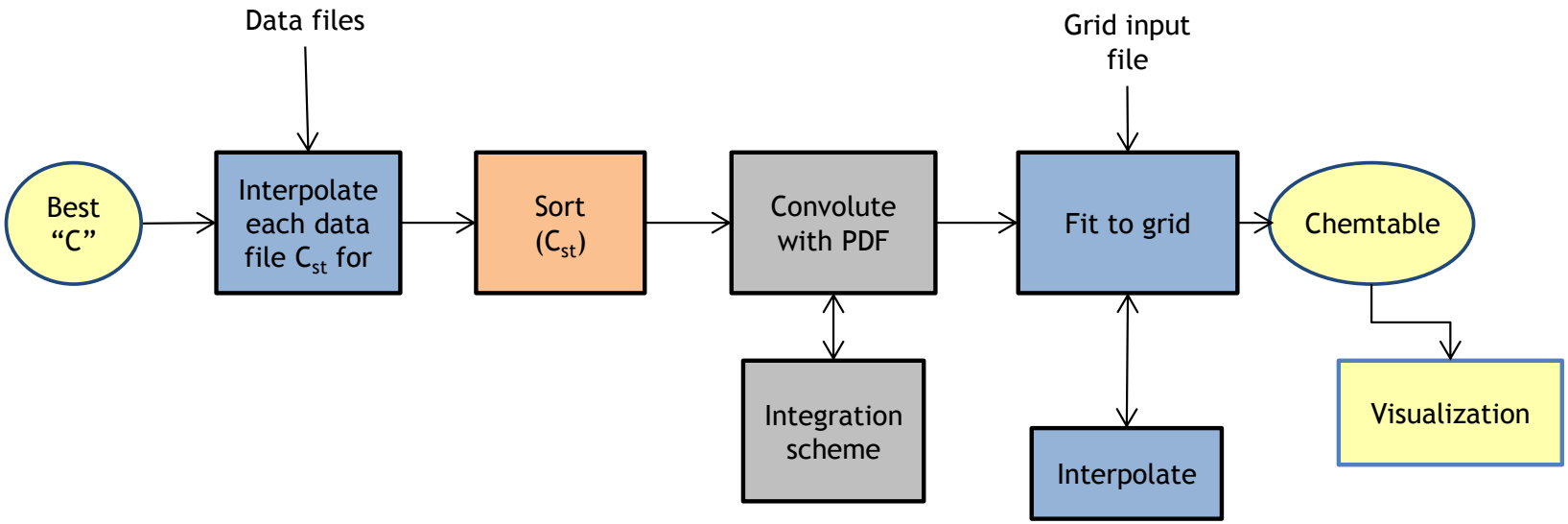
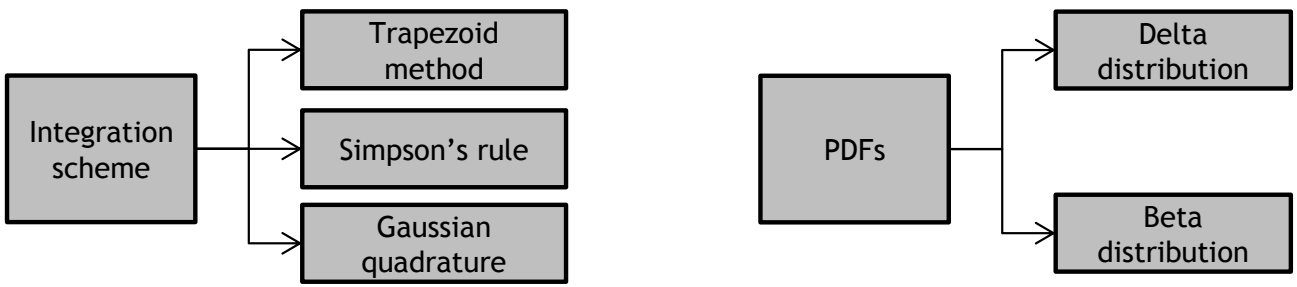


Table Generation





Daniel (C++) | Emre (C++) | Jeff (C++) | Emmet (C++) | Bruce (Python)

Python: User Interface and Wrapper

Python files:

- chemtable_io.py: Main program run by user: processes inputs, calls findprogvar.py and C++ functions, and generates ouput
- findprogvar.py: contains function that determines the best progress variable, calls C++ functions
- iofuncs.py: contains functions used by the above for text processing
- combinations.py: contains helper functions used by findprogvar.py

Inputs:

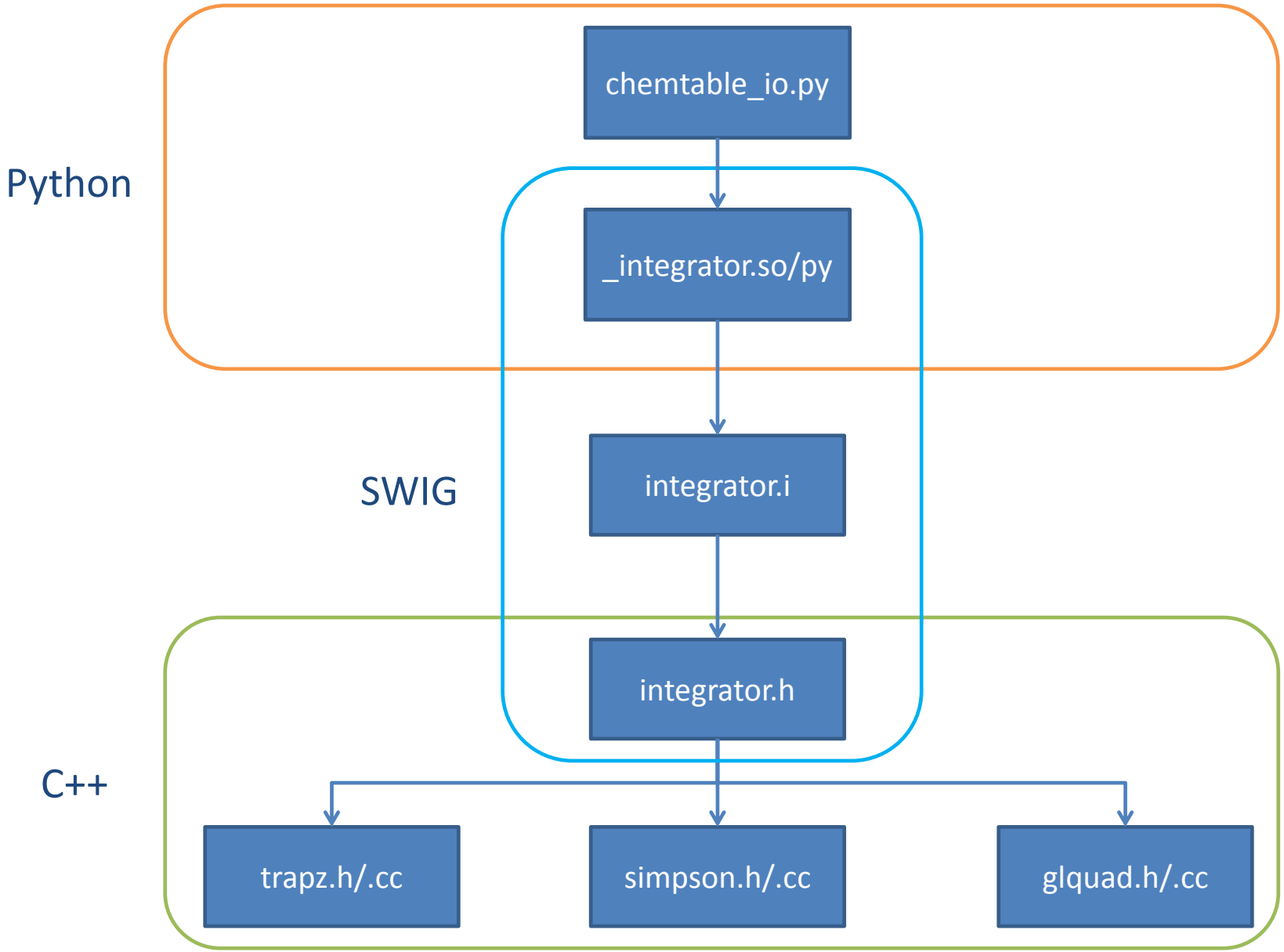
- chemtable_inputs: text file containing input options from user
- flamelet(.kg) data files: stored in a directory specified in the input file

User specified inputs stored in a Python dictionary

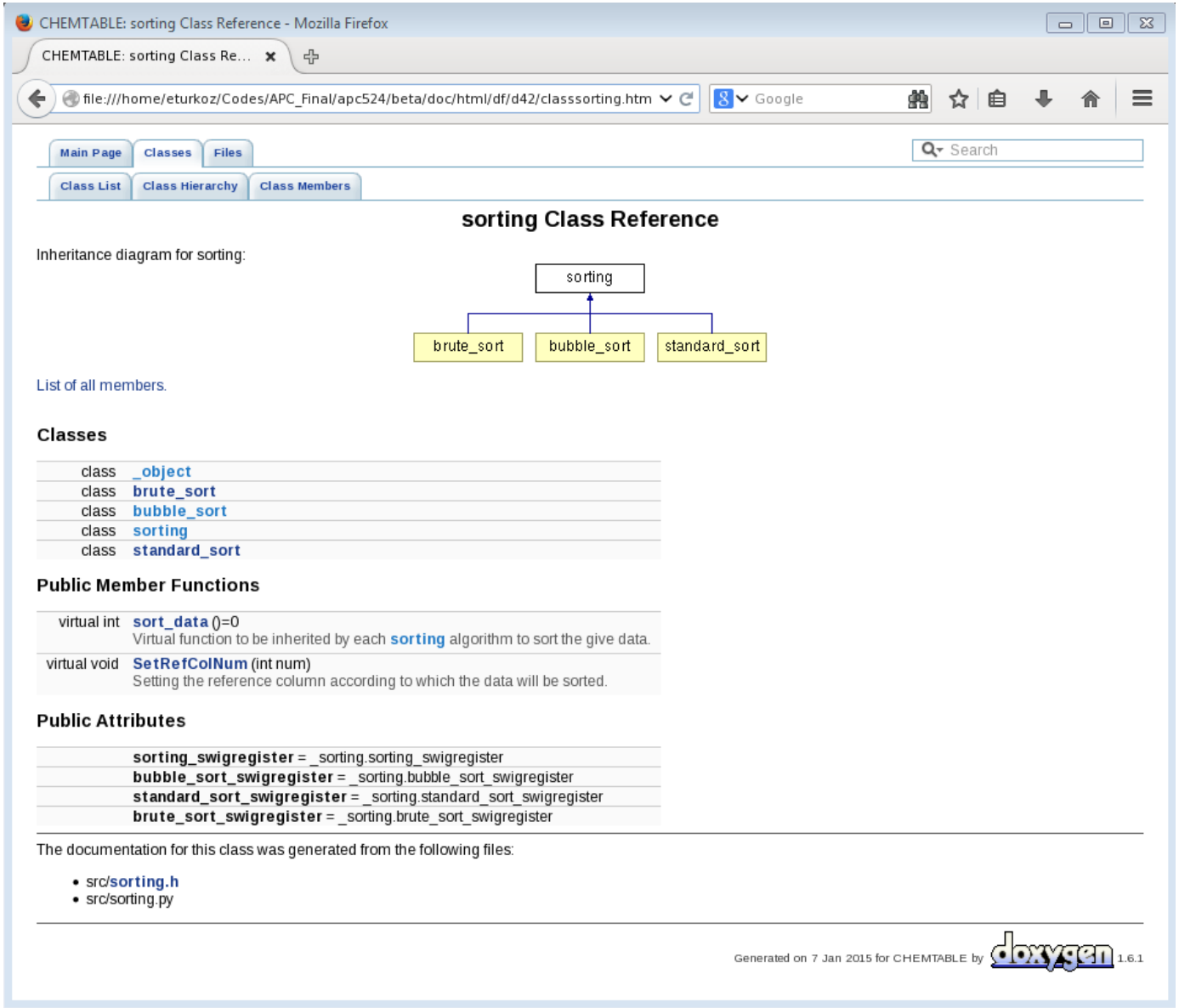
Outputs:

- data_out: text file containing processed chemical source

Python/C++ Interface Using SWIG



Documentation: Doxygen



Conclusions