

To Do List and Open Issues

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1 Active Tasks

1.1 Data architecture and variables

The current task is to create all the variables necessary to hold the simulation data. So far, the only existing variables are those used to read in text file data.

Most of the C++ variables were defined as members in classes. The classes are

- Data
- FlowVars
- InternalBoundary
- Approximator
- Time
- ExternalBoundary
- SimFluid
- Domain
- GeneticAlgorithm

Only some classes are instantiated in the main code, though, with some only existing within other classes as members. The data structure is roughly

Data is never instantiated, serves as an "abstract" class

```
Q[4] => air.[r,u,v,e]
Domain simRegion
    InternalBoundary body
    ExternalBoundary edge
SimFluid air
    FlowVars r,u,v,e
    Time t
Approximator solver
    GeneticAlgorithm ga
    dom => simregion
    air => air
```

where => denotes pointer variables

A full listing of the classes and their respective class member variables (not member functions) can be found in `C++_classes.txt`. Of course, there are also variables defined within the scope of certain functions. Those are listed in `C++_functions.txt`.

2 Future Improvements

2.1 Build Options

Improvement could be made to the makefile (or a different build software) for having different builds in separate directories for debugg and release versions. There are also some softwares that automatically figure out dependencies, so they don't have to be explicitly stated in the makefile.

2.2 Pre-processing/Data structure

The way the data is stored in the input text files and in variables within the code is suboptimal. Changes could be made both within pre-processing (i.e. the Matlab codes that generate those files) and how the variables are declared in Fortran.

3 Completed Tasks

3.1 Build Options

The code is built with a basic Makefile. Compilation flags are hardcoded, so a `make clean` is needed anytime flags are changed.

3.2 Read in simulation data

The data files necessary to make the code run are different depending on whether the code is running a 2- or 3-dimensional problem. For 2D, geometries, the metadata files are:

- SimulationValues.txt (Mach, AOA, Re)
- Sizes.txt (# of domain, body, farfield, cloud, ghost, extrapolation, total nodes)

and the geometry data files are:

- x,y.txt (node coordinates)
- DX,DY.txt (DQ coefficients)
- EC.txt (extrapolation coefficients)
- Jd,Jb,Jf.txt (domain, body, farfield node indices)
- nxb,nyb.txt (body node unit normal vectors)
- nxf,nyf.txt (farfield node unit normal vectors)
- s11,s12,s21,s22.txt (Flow tangency matrices)