Sunfluidh installation procedure

The sunfluidh project is placed on the forge and is handled with the version control system svn. In order to install sunfluidh on your computer, please, follow these steps :

- Ensure you get the required authorization to download the sunfluidh project with svn from the forge (contact AMIC for that)
- Define on your computer a directory to receipt the sunfluidh project (~/SUNFLUIDH for instance)
- Go to the directory SUNFLUIDH
- run the next command (to get the "beta-test" release) :
  svn co - -username your_login https://forge.limsi.fr/svn/SUNFLUIDH_DVPMT_2/TRUNK
  The last version of this sunfluidh project will be downloaded in the directory "~/SUNFLUIDH/TRUNK"
- run the next command (to get the current release) :
  svn co - -username your_login https://forge.limsi.fr/svn/SUNFLUIDH_PRD/TRUNK
  The last version of this sunfluidh project will be downloaded in the directory "~/SUNFLUIDH/TRUNK"

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Environment of the project

In the directory **"~/SUNFLUIDH/TRUNK"**, you will find several directories :

- **SOURCES** : This directory contains all the source files needed to compile the code. These sources files are compiled by means of the makefile file.
- **DOC** : It contains all documents related to the numerical methods implemented in the code (in french at present)
- **DATA** : It contains different directories :
  - In the directory "JOB_SCRIPTS" are given different shell scripts in order to run the code in batch mode on various type of computers (local cluster, IDRIS computers). These scripts must be considered as templates and must be adapted to your convenience. Three scripts are present :
    - **script_cluster_1.pbs** for the lab cluster "Grappe"
    - **script_jz_mpi_1.slurm** for the cluster Jean-Zay located at IDRIS
    - **script_irene_mpi_1.slurm** for the cluster Irene located at TGCC
  - The directory **REACTIVE_FLOWS_DATA** contains different peculiar files (.inc) which could be included in the code during the compilation procedure. They are devoted to reactive flow simulations only.
  - The directory **MAKEFILE_DIR** contains just one file named **makefile** for the code compilation
- **TOOLS_MATLAB** : Matlab tools for post-processing (Reading output files with Matlab (examples))
- **TOOLS_PYTHON** : Python tools for post-processing (forreading the binary output files, see Reading output files with Python (examples))

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Compilation procedure

In order to compile the code on your computer, please, follow these steps :

- Go to the directory "~/SUNFLUIDH/TRUNK/DATA/MAKEFILES_DIR" and copy the file "makefile" in the directory "~/SUNFLUIDH/TRUNK/SOURCES"
- Open the file "makefile", choose the compiler (pgi, ifort or gfortran) in regard to your system environment and define the relevant options of compilation (see "How to configure the makefile")
- Run the command "make" :The source files are compiled and an executable file is created. Its name depends on the option parameters chosen for the compilation (2D/3D, parallelization modes). It looks like "sunfluidh…x.

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How do start to work

Before starting to work with the code, find here some advises :

We suppose here your operating system is UNIX, LINUX or BSD and your shell is the BASH.

- Create a local working directory in your home directory (for instance "WORK").
- Create your own data file for sunfluidh in your work directory. This data file must be named "input3d.dat" in order to be recognized by sunfluidh. You can be guided by the various examples of data files provided here .
- Place the executable file (sunfluidh…x obtained after compiling in the directory) in your working directory and run it : ./sunfluidh.x
  The command to run sunfluidh must be executed in the working directory. All the result files created by the code will also be stored in the working directory.

It is often better to create a specific local directory in order to store your executable files rather than moving them from the compilation directory to the working directory. This prevents against the harmful overgrowth of executable files while more and more working directories are created over the time. For that :

- Create a specific directory in your home directory in order to store your own executable files (for instance "~/BIN")
- Move your executable files (here just sunfluidh.x) from the compilation directory to "BIN".
- In order to executable files can be ran anywhere in your working space, you must inform your computer system where they are stored. In your local root directory (your home), open the system file named .profile (or .bashrc, or .bashrc_profile this depends on your operating system) and write the command line : export PATH="your_home_directory_path"/BIN:$PATH
  "your_home_directory_path" is just a generic name to define the access to your home from the root directory of the sytem (use the UNIX/LINUX command "pwd" in your home directory to know it).

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