

# *HPC\_ReverseAugmentedConstrained*

## 1 REVERSE AUGMENTED OVERVIEW

**NOTE:** *Before using this driver, the user must install the Chronos package and activate its license. In order to download and install Chronos, please contact the developer team by using the form provided at (<https://www.m3eweb.it/chronos/>).*

This package is composed by the following directories:

- *Drivers* contains the source codes (c++) of the Driver\_Lagrange, the Reverse Augmented Constraint preconditioner and the Saddle Point matrix classes.
- *Chronos* is the symbolic link to the *INSTALL* directory of the the linear solver package (version 1.0).
- *ExternalLib* is the symbolic link to the the external libraries necessary for Chronos:
  - *lapack* lapack package (version 3.8.0).
  - *parmetis* metis package (version 4.0.3).
  - *pugixml* pugixml package (version 11.1).
  - *jwt-cpp* A header only library for creating and validating json web tokens in c++ (version 0.5.0).
  - *curlpp* C++ wrapper around libcurl (version 0.8.1).
  - *LexActivator* interface for Chronos with LexActivator package (<https://docs.cryptlex.com/>).

Both the *INSTALL* and the *ExternalLib* directories are provided in the Chronos installation package.

- *Binary* contains scripts (bash) to compile the driver.
- *Benchmarks* contains the examples used for the validation of the code.

## 2 TO COMPILE

The packages required are cmake 3.10.2, GNU 7.5.0, OMP 4.5, MPI 3.1.

### 2.1 COMPILE DRIVER

Create directories to store binary file in *Binary* directory:

```
mkdir Driver_Lagrange
```

Run scripts in *Binary* directory:

```
./run_cmake
./run_make
```

### 2.2 COMPILE DRIVER AFTER MINOR CHANGES

Run script in the *Binary* directory:

```
./run_make
```

### 2.3 COMPILE DRIVER AFTER MAJOR CHANGES

Run scripts in the *Binary* directory:

```
./rm_binary
./run_cmake
./run_make
```

## 3 TO RUN THE BENCHMARK

The executable *driver\_Lagrange* is located at the path *./Binary/Driver\_Lagrange/src/Core/driver\_Lagrange*. Move to *./Benchmarks/TestLagrange/* directory and extract the matrices from the archive with the following bash command:

```
tar -xvf mat.tar.gz
```

Finally, run the script with *./RUN* in order to test the program.