# Reproducing Results for 112018-00062

This document walks through the necessary steps to reproduce the results reported in paper #112018-00062 submitted for possible publication in Mathematical Programming Computation. Hence, the below `bash` commands are written for their servers, and should be modified accordingly for other *nix platforms.

We assume that the host machine has the following installed:

- `curl`, `configure` and `make` for building CMake,
- a toolchain that supports C++11 for building and using POLO,
- `boost`'s `program_options` module for building the test scripts,
- `curl` and `bunzip2` for downloading and unpacking the `rcv1` dataset, and,
- `pdflatex` with `mathtools` and `pgfplots` packages for generating the figures.

## Initial Setup

Before anything else, we should make a `local` directory under `$HOME` that contains binaries, libraries and configuration files of local installations of the programs:

```
mkdir -p $HOME/local/{bin,etc,include,lib,share}
ln -s lib $HOME/local/lib64
```

Then, we should modify `$HOME/.bash_profile` so that the environment variables `PATH` and `LD_LIBRARY_PATH` point to the correct locations:

```
# $HOME/.bash_profile

# Get the aliases and functions
if [ -f ~/.bashrc ]; then
  . ~/.bashrc
fi

# User specific environment and startup programs

PATH=$HOME/local/bin:$PATH
export PATH

LD_LIBRARY_PATH=$HOME/local/lib
export LD_LIBRARY_PATH
```

After saving the file, we need to `source $HOME/.bash_profile` to make the changes valid for the current session.

**NOTE.** On some systems, we *might* need to set `DYLD_FALLBACK_LIBRARY_PATH` instead of `LD_LIBRARY_PATH` above.

Now that we have setup the paths, we can proceed with the installation of CMake. POLO requires CMake (at least `v3.9.0`) to install its headers and C-API while managing its dependencies. Moreover, this repository also contains a superbuild CMake file to automate the dependency management and generation of the figures. To install CMake from source, we issue the following on the terminal:

```
# Build and install CMake from source
curl --output /tmp/cmake.tar.gz   \
  https://gitlab.kitware.com/cmake/cmake/-/archive/v3.9.0/cmake-v3.9.0.tar.gz
tar xzf /tmp/cmake.tar.gz -C /tmp
cd /tmp/cmake-v3.9.0
./configure --prefix=$HOME/local  \
            --datadir=share/cmake \
            --docdir=doc/cmake    \
            --no-qt-gui
make
make install
```

**NOTE.** At this point, we *might* need to logoff and login back to make environment changes valid so that `which cmake` points to the local installation with `cmake --version` reporting `3.9.0`.

## Experiments

Having successfully installed CMake, we finaly clone this repository and initiate the superbuild:

```
git clone https://github.com/pologrp/experiments $HOME/experiments
mkdir $HOME/experiments/build
cd $HOME/experiments/build
cmake -D CMAKE_INSTALL_PREFIX=$HOME/local ../
cmake --build .
```

to

- install all the necessary programs, i.e., 0MQ (`v4.2.5`), OpenBLAS (`v0.3.3`), cereal (`v1.2.2`), Google Test (`v1.8.1`, for unit testing), and POLO,
- build and run the test scripts used in the paper, and,
- reproduce the figures from the generated results.

When the superbuild finishes, we should find a `figures.pdf` file under `$HOME/experiments/build/external/BUILD/experiments`.