

Installing LAPACK

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LAPACK

- Linear Algebra Package
- Contains lots of optimized matrix algebra subroutines.
- Useful for small-ish matrix computations, not for bigger problems.

LAPACK — Linear Algebra PACKage

Menu

[Presentation](#)

[Software](#)

[Licensing](#)

[LAPACK, version 3.7.0](#)

[Standard C language bindings for LAPACK](#)

[LAPACK for windows](#)

[GIT Access](#)

[Support](#)

[Contributors](#)

[Documentation](#)

[Release Notes](#)

[Improvements and Bugs](#)

[FAQ](#)

[Browse, Download LAPACK routines with on-line documentation browser](#)

[Users' Guide](#)

[Manpages](#)

[LAWNS: LAPACK Working Notes](#)

[Release History](#)

[Previous Release](#)

[LAPACK, version 3.7.0](#)

[LAPACK, version 3.6.1](#)

[LAPACK, version 3.6.0](#)

[LAPACK, version 3.5.0](#)

[LAPACK, version 3.4.2](#)

[LAPACK, version 3.4.1](#)

[LAPACK, version 3.4.0](#)

[LAPACK, version 3.3.1](#)

[LAPACK version 3.3.0](#)

[LAPACK version 3.2.2](#)

[LAPACK version 3.2.1](#)

[LAPACK version 3.2 with CMAKE package](#)

[LAPACK version 3.2](#)

[LAPACK version 3.1.1 with manpages and html](#)

[LAPACK version 3.1.1](#)

www.netlib.org/lapack

LAPACK — Linear Algebra PAC x Matthew

www.netlib.org/lapack/#_lapack_version_3_7_0

LAPACK, version 3.7.0

- Download: [lapack-3.7.0.tgz](#)
- [LAPACK 3.7.0 Release Notes](#)
- Updated: Decemeber 24, 2016
- [LAPACK GitHub Open Bug](#) (Current known bugs)

*Download the tarred, zipped
LAPACK source code.*

Standard C language APIs for LAPACK

collaboration LAPACK and INTEL Math Kernel Library Team

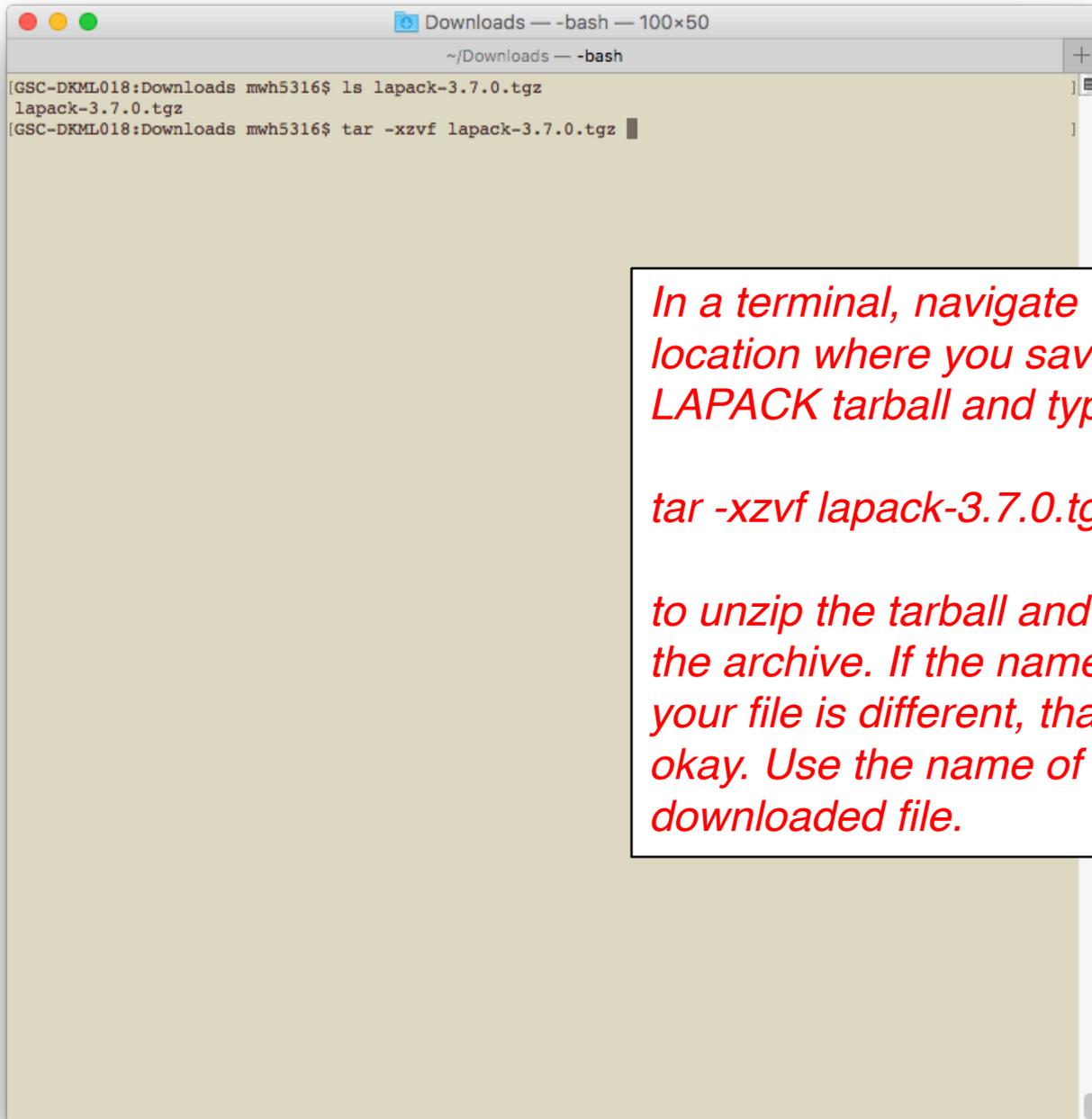
- LAPACK C INTERFACE is now included in the LAPACK package (in the lapacke directory)
- [LAPACK User Guide](#)
- Updated: November 16, 2013
- header files: [lapacke.h](#), [lapacke_config.h](#), [lapacke_mangling.h](#), [lapacke_utils.h](#)

LAPACK for Windows

LAPACK is built under Windows using [Cmake](#) the cross-platform, open-source build system. The new build system was developed in collaboration with Kitware Inc.

A dedicated website (<http://icl.cs.utk.edu/lapack-for-windows/lapack>) is available for Windows users.

- You will find information about your configuration need.
- You will be able to download BLAS, LAPACK, LAPACKE pre-built libraries.
- You will learn how you can directly run LAPACK from VS Studio (just C code, no Fortran!!!). LAPACK now offers Windows users the ability to code in C using Microsoft Visual Studio and link to LAPACK Fortran libraries without the need of a vendor-supplied Fortran compiler add-on. To get more information, please refer to [lawn 270](#).
- You will get step by steps procedures Easy Windows Build.

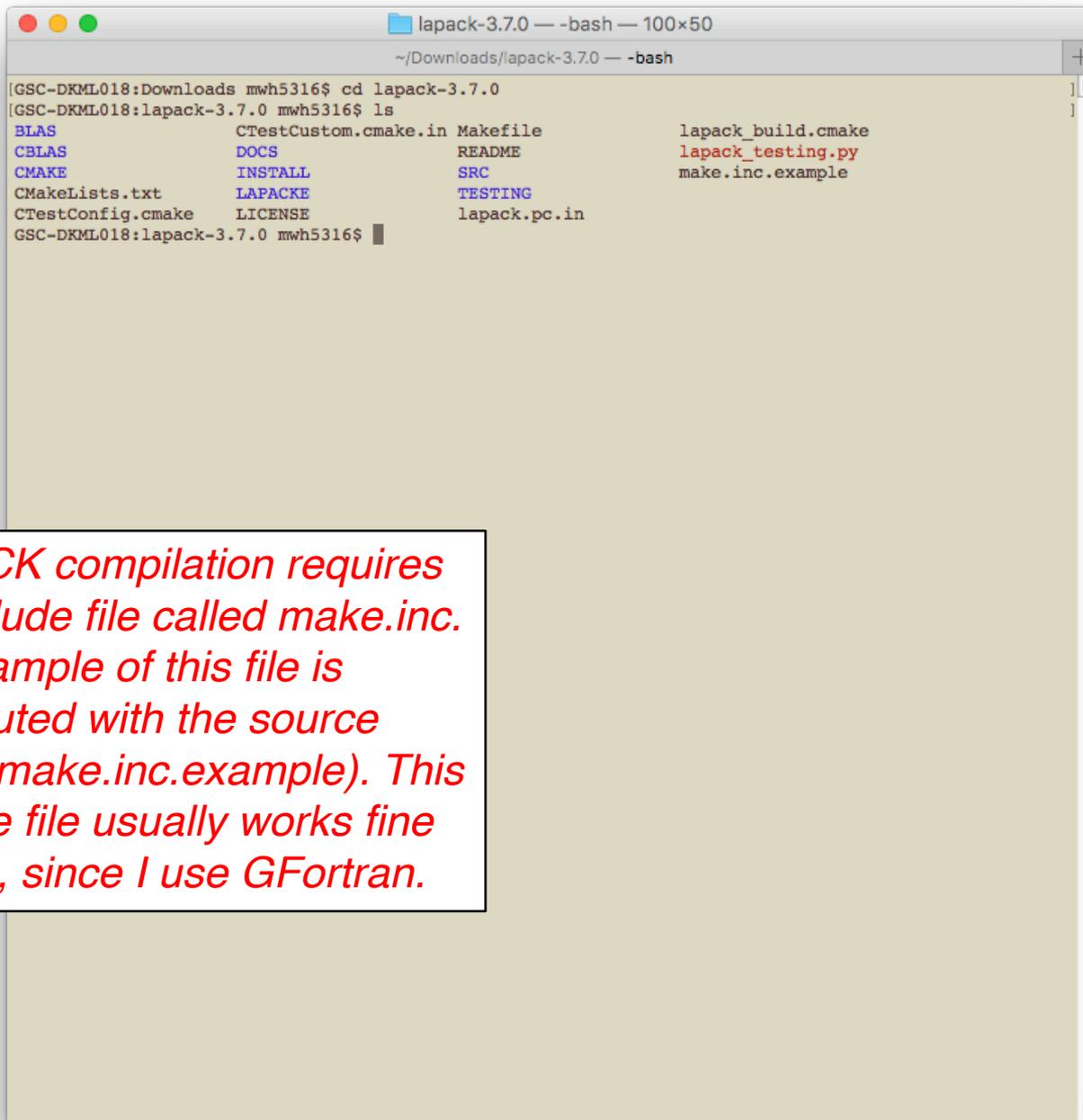
A terminal window titled "Downloads — -bash — 100x50" with a sub-header "~ /Downloads — -bash". The terminal shows the following commands and output:

```
[GSC-DKML018:Downloads mwh5316$ ls lapack-3.7.0.tgz  
lapack-3.7.0.tgz  
[GSC-DKML018:Downloads mwh5316$ tar -xzvf lapack-3.7.0.tgz
```

In a terminal, navigate to the location where you saved the LAPACK tarball and type:

tar -xzvf lapack-3.7.0.tgz

to unzip the tarball and extract the archive. If the name of your file is different, that is okay. Use the name of your downloaded file.



```
lapack-3.7.0 — -bash — 100x50
~/Downloads/lapack-3.7.0 — -bash
[GSC-DKML018:Downloads mwh5316$ cd lapack-3.7.0
[GSC-DKML018:lapack-3.7.0 mwh5316$ ls
BLAS          CTestCustom.cmake.in  Makefile          lapack_build.cmake
CBLAS        DOCS                   README            lapack_testing.py
CMAKE        INSTALL               SRC               make.inc.example
CMakeLists.txt  LAPACKE              TESTING
CTestConfig.cmake  LICENSE              lapack.pc.in
GSC-DKML018:lapack-3.7.0 mwh5316$
```

LAPACK compilation requires an include file called make.inc. An example of this file is distributed with the source code (make.inc.example). This include file usually works fine for me, since I use GFortran.

```
lapack-3.7.0 — vi Makefile — 100x50
~/Downloads/lapack-3.7.0 — vi Makefile

# Top Level Makefile for LAPACK
# Version 3.4.1
# April 2012
#

include make.inc

all: lapack_install lib blas_testing lapack_testing

lib: lapacklib tmglib
#lib: blaslib variants lapacklib tmglib

clean: cleanlib cleantesting cleanblas_testing cleancblas_testing

lapack_install:
    ( cd INSTALL; $(MAKE); ./testlsame; ./testslamch; ./testdlamch; \
      ./testsecond; ./testdsecnd; ./testieee; ./testversion )

blaslib:
    ( cd BLAS/SRC; $(MAKE) )

cblaslib:
    ( cd CBLAS; $(MAKE) )

lapacklib: lapack_install
    ( cd SRC; $(MAKE) )

lapackelib: lapacklib
    ( cd LAPACKE; $(MAKE) )

cblas_example: cblaslib blaslib
    ( cd CBLAS/examples; $(MAKE) )

lapacke_example: lapackelib
    ( cd LAPACKE/example; $(MAKE) )

variants:
    ( cd SRC/VARIANTS; $(MAKE) )

tmglib:
    ( cd TESTING/MATGEN; $(MAKE) )

lapack_testing: lib
    ( cd TESTING; $(MAKE) )
    ./lapack_testing.py

variants_testing: lib variants
    ( cd TESTING; rm -f xlintst*; $(MAKE) VARLIB='SRC/VARIANTS/LIB/cholrl.a'; \
      "Makefile" 128L, 4123C

1,1 Top
```

One more (annoying) little thing: the default Makefile does not compile the BLAS (Basic Linear Algebra Subroutines – the precursor to LAPACK) library. To compile BLAS, edit the Makefile.

```
lapack-3.7.0 — vi Makefile — 100x50
~/Downloads/lapack-3.7.0 — vi Makefile

# Top Level Makefile for LAPACK
# Version 3.4.1
# April 2012
#

include make.inc

all: lapack_install lib blas_testing lapack_testing

#lib: lapacklib tmglib
lib: blaslib variants lapacklib tmglib

clean: cleanlib cleantesting cleanblas_testing cleancblas_testing

lapack_install:
    ( cd INSTALL; $(MAKE); ./testlsame; ./testslamch; ./testdlamch; \
      ./testsecond; ./testdsecnd; ./testieee; ./testversion )

blaslib:
    ( cd BLAS/SRC; $(MAKE) )

cblaslib:
    ( cd CBLAS; $(MAKE) )

lapacklib: lapack_install
    ( cd SRC; $(MAKE) )

lapackelib: lapacklib
    ( cd LAPACKE; $(MAKE) )

cblas_example: cblaslib blaslib
    ( cd CBLAS/examples; $(MAKE) )

lapacke_example: lapackelib
    ( cd LAPACKE/example; $(MAKE) )

variants:
    ( cd SRC/VARIANTS; $(MAKE) )

tmglib:
    ( cd TESTING/MATGEN; $(MAKE) )

lapack_testing: lib
    ( cd TESTING; $(MAKE) )
    ./lapack_testing.py

variants_testing: lib variants
    ( cd TESTING; rm -f xlintst*; $(MAKE) VARLIB='SRC/VARIANTS/LIB/cholrl.a'; \
      "Makefile" 128L, 4123C written

1,1 Top
```

Move the “#” to be in front of the line that reads:

lib: lapacklib tmglib

*Type “make,” hit the return
key, and wait....*

```
lapack-3.7.0 — -bash — 100x50
~/Downloads/lapack-3.7.0 — -bash
[GSC-DKML018:lapack-3.7.0 mwh5316$ ls
BLAS          DOCS          SRC           librefblas.a
CBLAS        INSTALL      TESTING      libtmglib.a
CMAKE        LAPACK      lapack.pc.in  make.inc
CMakeLists.txt LICENSE     lapack_build.cmake  make.inc.example
CTestConfig.cmake  Makefile   lapack_testing.py
CTestCustom.cmake.in  README    liblapack.a
GSC-DKML018:lapack-3.7.0 mwh5316$
```

Congratulations!

***You have compiled the
LAPACK libraries.***