

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

Matthew

www.netlib.org/lapack/

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www.netlib.org/lapack

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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

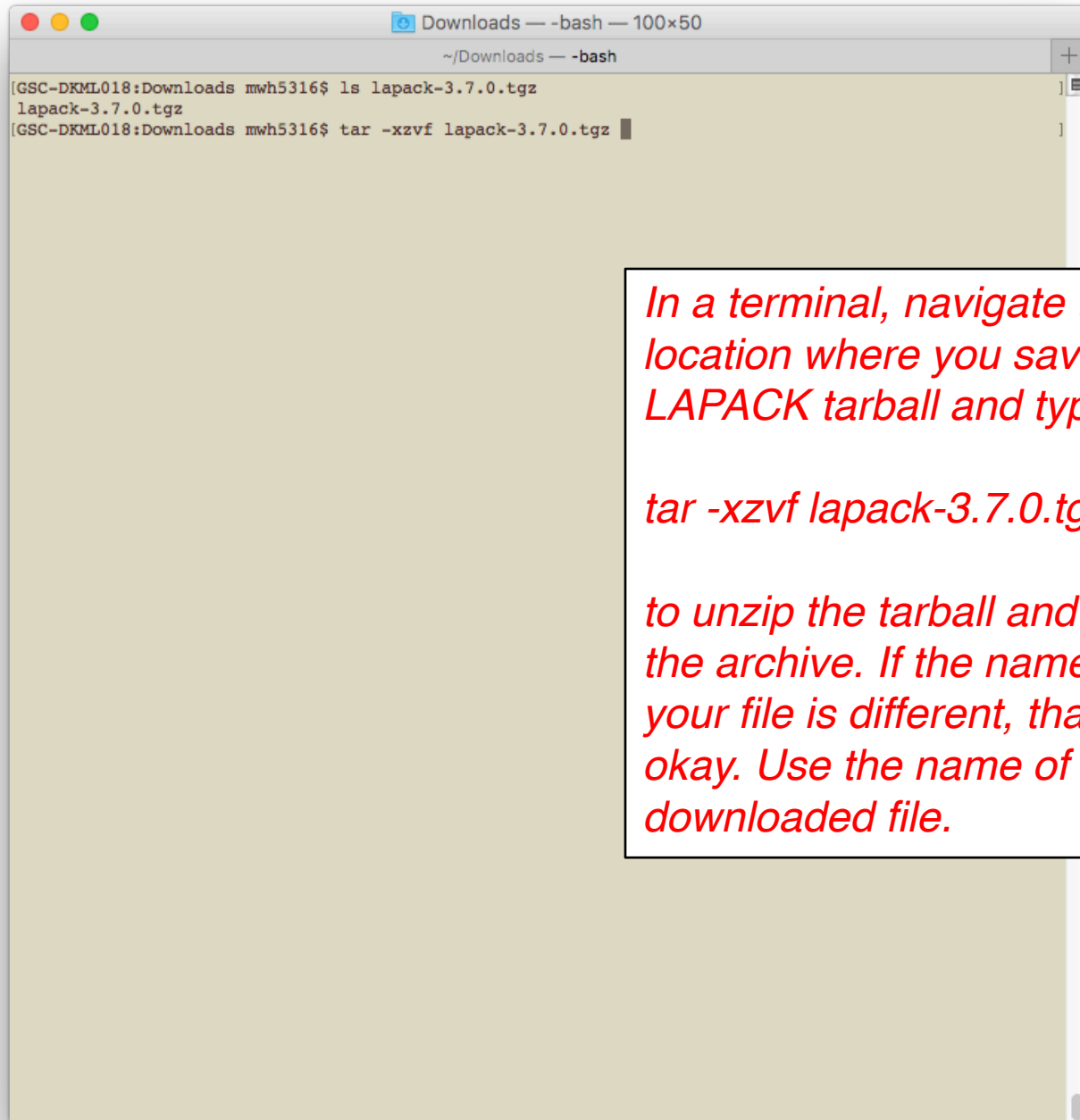
- LAPACK C INTERFACE is now included in the LAPACK package (in the lapacke directory)
- [LAPACKE User Guide](#)
- Updated: November 16, 2013
- header files: [lapacke.h](#), [lapacke_config.h](#), [lapacke_mangling.h](#), [lapacke_utils.h](#)

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 LAPACKE 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.

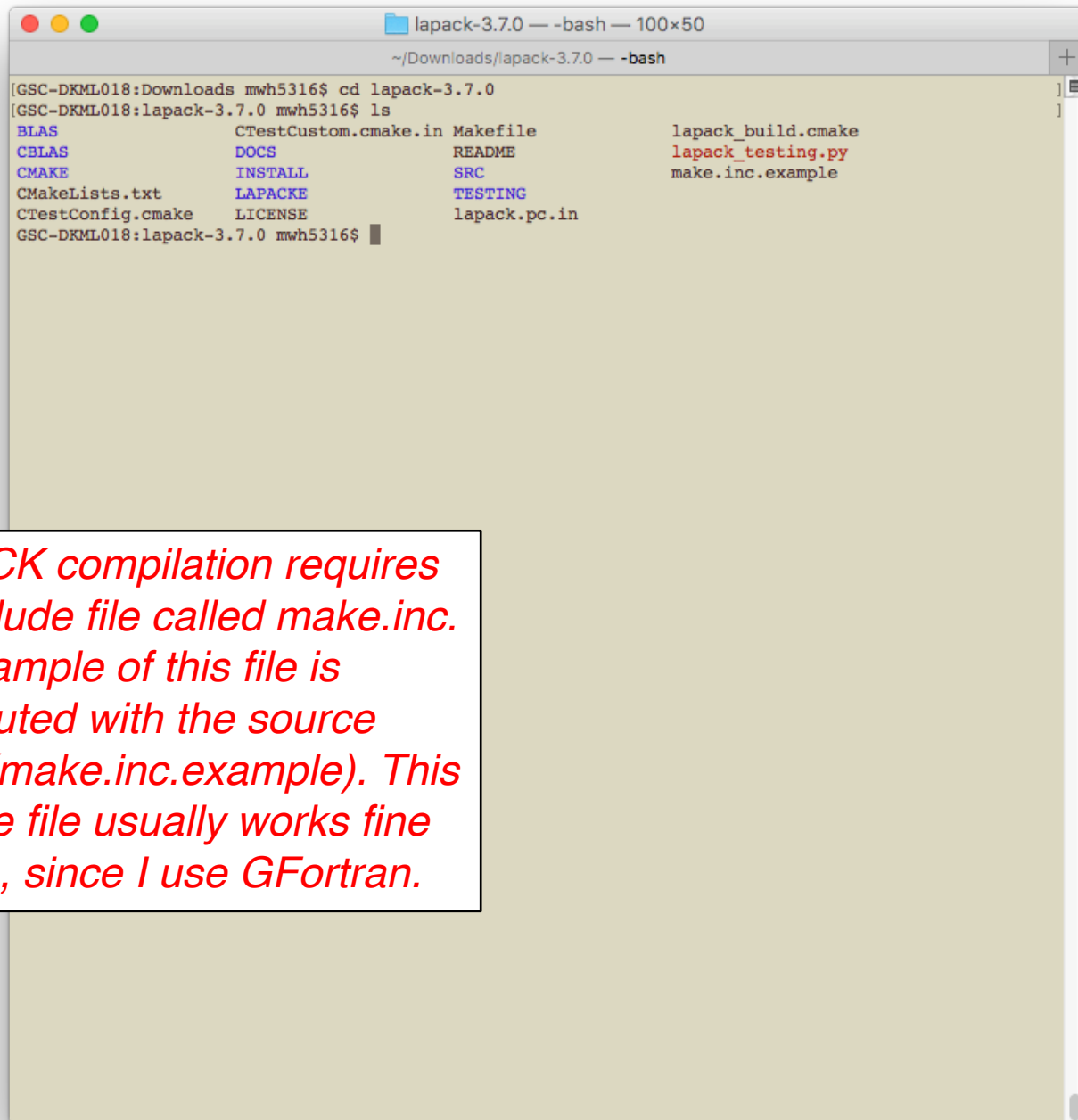
A terminal window titled "Downloads — -bash — 100x50" with a subtitle "~/Downloads — -bash". The window shows a user named "mwh5316" in a directory "GSC-DKML018:Downloads". The user has run the command "ls lapack-3.7.0.tgz" and then "tar -xzvf lapack-3.7.0.tgz".

```
Downloads — -bash — 100x50
~/Downloads — -bash
[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 LAPACK               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/choirl.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 LAPACK; $(MAKE) )

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

lapacke_example: lapackelib
    ( cd LAPACK/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/choirl.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.*