Getting started with PETSc

configuring and running your first code

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seminar organization

- because you showed up today, you get a free book
  - the first five chapters are done-ish
  - I hope to have 3 more chapters for you by March-ish
- you don't have to take this for credit
  - if you do want 1.0 Math 692 credit (pass/fail) then plan to write at least one *working* example PDE code using PETSc
    - easy because I provide lots of examples
    - any language you want (C, FORTRAN, python, . . .), if it has PETSc bindings

book and codes are online

- the LaTeX sources and C example codes from my book are at
  - github.com/bueler/p4pdes
  - let me know if you want a compiled PDF of the book emailed to you
- this seminar is also my blog
  - bueler.github.io/p4pdes
- these LaTeX Beamer PDF slides are generated from the blog (markdown page) by

```
pandoc -t beamer blogpage.md -o slides.pdf
```

  - no `.tex` file required
  - cool, huh?

download and configure PETSc

- the PETSc download page is www.mcs.anl.gov/petsc/download/index.html
- get the "lite" version as `tar.gz`
- try to configure:

```
$ tar -xzvf petsc-lite-3.6.3.tar.gz
$ cd petsc-3.6.3/
$ export PETSC_DIR=`pwd`
$ export PETSC_ARCH=linux-c-dbg
$ ./configure --download--mpich \
  --download-triangle --with-debugging=1
```

make and test PETSc

- make and test:

```
$ make all
$ make test
```

- success if you see `... /ex19 run successfully with 2 MPI processes`
- to use this PETSc installation you'll need to add these lines (or similar) to `.bashrc` (or similar):

```
export PETSC_DIR=/home/bueler/petsc-3.6.3/
export PETSC_ARCH=linux-c-dbg
```

PETSc source code contains examples, too

- look in `examples/tutorials/` source directories:

```
$ cd src/snes/examples/tutorials/
$ gedit ex5.c &
```

- but these examples are
  - usually not well-documented
    - especially mathematical ideas and algorithmic possibilities
  - cluttered with whatever the last PETSc dev who touched it was interested in
  - thus my book
    - and some PETSc devs agree a book is needed

FIXME c/ch1/ and e.c

FIXME some linear algebra

- some math

$$\sin(e^x)$$

- more math

$$\int e^x \, dx$$