

Use (of) the GNU Scientific Library in NLP Applications

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NLP Resource Seminar

What it is

The GNU Scientific Library (GSL) is a collection of numerical subroutines written in C and available under the **GNU General Public License** (GPL).

[`http://www.gnu.org/software/gsl/`](http://www.gnu.org/software/gsl/)

[`http://sources.redhat.com/gsl/`](http://sources.redhat.com/gsl/)

Locally (for now) in `file:/proj/nlp/scratch/gnu/`

Why you might care

If your work involves one or more of the following, you should be aware of GSL:

- Probabilistic modeling;
- Optimization;
- Linear algebra; or
- certain other numerical computations.

GSL is big (yet highly modular)

- More than 1000 functions;
- more than 200 header files;
- 11 MB static library (on Solaris); and
- a 600+ page printed handbook.

Unlike Numerical Recipes code, GSL. . .

- . . . has a well thought-out, C-friendly design;
- . . . has an active group of core developers;
- . . . is free-as-in-GPL; and
- . . . might already be on a computer near you (package `libgsl0-dev` in Debian).

Don't use GSL if you need. . .

- . . . discrete CDFs and their inverses (these are under development – meanwhile, use the **R** library instead);
- . . . highly optimized Discrete Fourier Transform code (use **fftw** instead);
- . . . linear algebra beyond matrices (tensors).

How to use GSL

Edit foo.c:

```
#include <gsl/gsl_math.h>
#include <gsl/gsl_rng.h>
```

Compile with:

```
gcc $CFLAGS 'gsl-config --cflags' -c foo.c
```

Link with:

```
gcc $LDFLAGS foo.o $LDLIBS 'gsl-config --libs'
```

A brief example

Which illustrates:

- random number generators;
- random variates;
- histograms;
- probability distributions.

[\[C source\]](#) [\[pretty HTML\]](#) [\[Makefile\]](#)

Many more examples in the Really Totally Fine Manual.