gig Documentation

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Draws from the Generalized Inverse Gaussian distribution

$$f(x) = x^{\lambda-1} e^{-\frac{1}{2}(\chi/x+\psi x)}$$

where λ is any real number, χ must be nonnegative (nonpositive) for positive (negative) λ and ψ must be be nonnegative (nonpositive) for negative (positive) λ.

CHAPTER 1

Install

Download and unpack the latest version. In the unpacked folder, type

```
mkdir build
cd build
cmake ..
make
```

It should create the shared and static libraries

```
libgig.[version].[extension]
libgig_static.[extension]
```

You can enter

```
make test
```

to test it and

```
make install
```

to install it.

CHAPTER 2

Usage example

Suppose you have the file

```
/* example.cpp */
#include "gig/gig.h"

#include <random>
#include <iostream>

int main()
{
  Random random(1);

  double lambda = 2.1;
  double chi = 0.1;
  double psi = 1.0;

  std::cout << random.gig(lambda, chi, psi) << std::endl;
}
```

Compiling, linking, and running it via

```
g++ -lgig example.cpp -o example
./example
```

should print:

```
1.30869
```

CHAPTER 3

Interface

class `Random`

Generalized Inverse Gaussian distribution sampler.

`Random::Random`(unsigned int *seed*)

Initialize sampler with a seed.

Parameters `seed` – Seed.

`Random::Random`(std::default_random_engine &*generator*)

Initialize sampler with a random number generator.

Parameters `generator` – Generator.

double `Random::gig`(double *lambda*, double *chi*, double *psi*)

Draw sample from GIG distribution.

Parameters

- `double lambda` – shape parameter.
- `double chi` – shape and scale parameter.
- `double psi` – shape and scale parameter.

Returns sample.

CHAPTER 4

Disclaimer

This library is simply a wrapper around Josef Leydold and Wolfgang Hormann's implementation of a GIG sampler found in the GIGrvg package.

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