MexIFace

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Contents

1 Main Page

C++ Parallel RNG Interface for OpenMP using TRNG

2 Namespace Index

2.1 Namespace List

Here is a list of all namespaces with brief descriptions:

3 Hierarchical Index

3.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

4 Class Index

4.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

5 File Index

5.1 File List

Here is a list of all files with brief descriptions:

6 Namespace Documentation

6.1 parallel_rng Namespace Reference

Classes

- class ParallelRngManagerError
- class ParallelRngManager

Typedefs

- using DefaultParallelRngT = trng::lcg64_shift

  Suggested default ParallelRNG type.
- using SeedT = uint64_t

  Use the true random interface to generate a truly random seed.
- using IdxT = arma::uword

Functions

- SeedT generate_seed ()
- IdxT openmp_estimate_max_threads ()

  Use openmp to estimate the maximum number of threads that will be generated.
- template<class RngT = DefaultParallelRngT, class FloatT = double>
  ParallelRngManager< RngT, FloatT > make_parallel_rng_manager ()
- template<class RngT = DefaultParallelRngT, class FloatT = double>
  ParallelRngManager< RngT, FloatT > make_parallel_rng_manager (SeedT seed)

Variables

- rngs {num_threads,cache_alignment, RngT{seeder}}
- norm_dist {num_threads,cache_alignment, NormalDistT{}}

6.1.1 Typedef Documentation

6.1.1.1 using parallel_rng::DefaultParallelRngT = typedef trng::lcg64_shift

Suggested default ParallelRNG type.

lcg64_shift is one of the fastest ParallelRNG types with shifting to correct for poor lower order bit randomness in regular lcg64

Definition at line 58 of file ParallelRngManager.h.

6.1.1.2 using parallel_rng::IdxT = typedef arma::uword

Definition at line 72 of file ParallelRngManager.h.

6.1.1.3 using parallel_rng::SeedT = typedef uint64_t

Use the true random interface to generate a truly random seed.

Definition at line 71 of file ParallelRngManager.h.

6.1.2 Function Documentation

6.1.2.1 SeedT parallel_rng::generate_seed ( )

Definition at line 14 of file ParallelRngManager.cpp.

6.1.2.2 template<class RngT = DefaultParallelRngT, class FloatT = double> ParallelRngManager<RngT,FloatT> parallel_rng::make_parallel_rng_manager ( )

Definition at line 143 of file ParallelRngManager.h.

6.1.2.3 template<class RngT = DefaultParallelRngT, class FloatT = double> ParallelRngManager<RngT,FloatT> parallel_rng::make_parallel_rng_manager (SeedT *seed*)

Definition at line 149 of file ParallelRngManager.h.

6.1.2.4 IdxT parallel_rng::openmp_estimate_max_threads ( )

Use openmp to estimate the maximum number of threads that will be generated.

Definition at line 20 of file ParallelRngManager.cpp.

6.1.3 Variable Documentation

6.1.3.1 parallel_rng::norm_dist {num_threads,cache_alignment, NormalDistT{}}

Definition at line 173 of file ParallelRngManager.h.

6.1.3.2 parallel_rng::rngs {num_threads,cache_alignment, RngT{seeder}}

Definition at line 172 of file ParallelRngManager.h.

7 Class Documentation

7.1 parallel_rng::ParallelRngManager< RngT, FloatT > Class Template Reference

`#include </home/travis/build/markjolah/ParallelRngManager/include/ParallelRng-Manager/ParallelRngManager.h>`

Public Types

- using VecT = arma::Col< FloatT >
- using MatT = arma::Mat< FloatT >
- using NormalDistT = std::normal_distribution< FloatT >
- using UniformDistT = std::uniform_real_distribution< FloatT >
- using result_type = typename RngT::result_type

Public Member Functions

- ParallelRngManager ()
- ParallelRngManager (SeedT seed)
- ParallelRngManager (SeedT seed, IdxT max_threads)
- void seed (SeedT seed)
- void reset ()
- void reset (SeedT seed)
- void reset (SeedT seed, IdxT max_threads)
- SeedT get_init_seed () const
- SeedT get_num_threads () const
- RngT & generator ()
- any_rng::AnyRng< result_type > generic_generator ()
- result_type operator() ()
- FloatT randu ()
- FloatT randn ()
- VecT randu (IdxT N)
- VecT randn (IdxT N)
- MatT randu (IdxT rows, IdxT cols)
- MatT randn (IdxT rows, IdxT cols)
- template<class Weights = VecT, class IdxT = IdxT>
  IdxT resample_dist (const Weights &weights)
- template<class Weights = VecT, class IdxT = IdxT>
  arma::Col< IdxT > resample_dist (const Weights &weights, IdxT N)

7.1.1 Detailed Description

template<class RngT = DefaultParallelRngT, class FloatT = double>class parallel_rng::ParallelRngManager< RngT, FloatT >

Definition at line 80 of file ParallelRngManager.h.

7.1.2 Member Typedef Documentation

7.1.2.1 template<class RngT = DefaultParallelRngT, class FloatT = double> using parallel_rng::ParallelRngManager< RngT, FloatT >::MatT = arma::Mat<FloatT>

Definition at line 84 of file ParallelRngManager.h.

7.1.2.2 template<class RngT = DefaultParallelRngT, class FloatT = double> using parallel_rng::ParallelRngManager< RngT, FloatT >::NormalDistT = std::normal_distribution<FloatT>

Definition at line 85 of file ParallelRngManager.h.

7.1.2.3 template<class RngT = DefaultParallelRngT, class FloatT = double> using parallel_rng::ParallelRngManager< RngT, FloatT >::result_type = typename RngT::result_type

Definition at line 87 of file ParallelRngManager.h.

7.1.2.4 template<class RngT = DefaultParallelRngT, class FloatT = double> using parallel_rng::ParallelRngManager< RngT, FloatT >::UniformDistT = std::uniform_real_distribution<FloatT>

Definition at line 86 of file ParallelRngManager.h.

7.1.2.5 template<class RngT = DefaultParallelRngT, class FloatT = double> using parallel_rng::ParallelRngManager< RngT, FloatT >::VecT = arma::Col<FloatT>

Definition at line 83 of file ParallelRngManager.h.

7.1.3 Constructor & Destructor Documentation

7.1.3.1 template<class RngT , class FloatT > parallel_rng::ParallelRngManager< RngT, FloatT >::ParallelRngManager ( )

Definition at line 157 of file ParallelRngManager.h.

7.1.3.2 template<class RngT , class FloatT > parallel_rng::ParallelRngManager< RngT, FloatT >::ParallelRngManager (SeedT *seed*)

Definition at line 162 of file ParallelRngManager.h.

7.1.3.3 template<class RngT , class FloatT > parallel_rng::ParallelRngManager< RngT, FloatT >::ParallelRngManager (SeedT *seed,* IdxT *max_threads*)

Definition at line 167 of file ParallelRngManager.h.

7.1.4 Member Function Documentation

7.1.4.1 template<class RngT = DefaultParallelRngT, class FloatT = double> RngT& parallel_rng::ParallelRngManager< RngT, FloatT >::generator ( )

7.1.4.2 template<class RngT = DefaultParallelRngT, class FloatT = double> any_rng::AnyRng<result_type> parallel_rng::ParallelRngManager< RngT, FloatT >::generic_generator ( )

7.1.4.3 template<class RngT = DefaultParallelRngT, class FloatT = double> SeedT parallel_rng::ParallelRngManager< RngT, FloatT >::get_init_seed ( ) const

7.1.4.4 template<class RngT = DefaultParallelRngT, class FloatT = double> SeedT parallel_rng::ParallelRngManager< RngT, FloatT >::get_num_threads ( ) const

7.1.4.5 template<class RngT = DefaultParallelRngT, class FloatT = double> result_type parallel_rng::ParallelRngManager< RngT, FloatT >::operator() ( )

7.1.4.6 template<class RngT = DefaultParallelRngT, class FloatT = double> FloatT parallel_rng::ParallelRngManager< RngT, FloatT >::randn ( )

7.1.4.7 template<class RngT = DefaultParallelRngT, class FloatT = double> VecT parallel_rng::ParallelRngManager< RngT, FloatT >::randn (IdxT *N*)

7.1.4.8 template<class RngT = DefaultParallelRngT, class FloatT = double> MatT parallel_rng::ParallelRngManager< RngT, FloatT >::randn (IdxT *rows,* IdxT *cols*)

7.1.4.9 template<class RngT = DefaultParallelRngT, class FloatT = double> FloatT parallel_rng::ParallelRngManager< RngT, FloatT >::randu ( )

7.1.4.10 template<class RngT = DefaultParallelRngT, class FloatT = double> VecT parallel_rng::ParallelRngManager< RngT, FloatT >::randu (IdxT *N*)

7.1.4.11 template<class RngT = DefaultParallelRngT, class FloatT = double> MatT parallel_rng::ParallelRngManager< RngT, FloatT >::randu (IdxT *rows,* IdxT *cols*)

7.1.4.12 template<class RngT = DefaultParallelRngT, class FloatT = double> template<class Weights = VecT, class IdxT = IdxT> IdxT parallel_rng::ParallelRngManager< RngT, FloatT >::resample_dist (const Weights & *weights*)

7.1.4.13 template<class RngT = DefaultParallelRngT, class FloatT = double> template<class Weights = VecT, class IdxT = IdxT> arma::Col<IdxT> parallel_rng::ParallelRngManager< RngT, FloatT >::resample_dist (const Weights & *weights,* IdxT *N*)

7.1.4.14 template<class RngT = DefaultParallelRngT, class FloatT = double> void parallel_rng::ParallelRngManager< RngT, FloatT >::reset ( )

7.1.4.15 template<class RngT = DefaultParallelRngT, class FloatT = double> void parallel_rng::ParallelRngManager< RngT, FloatT >::reset (SeedT *seed*)

7.1.4.16 template<class RngT = DefaultParallelRngT, class FloatT = double> void parallel_rng::ParallelRngManager< RngT, FloatT >::reset (SeedT *seed,* IdxT *max_threads*)

7.1.4.17 template<class RngT = DefaultParallelRngT, class FloatT = double> void parallel_rng::ParallelRngManager< RngT, FloatT >::seed (SeedT *seed*)

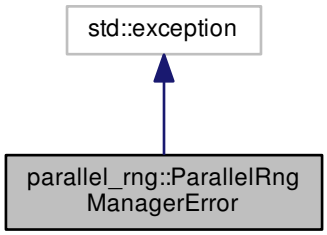
The documentation for this class was generated from the following file:

- ParallelRngManager.h

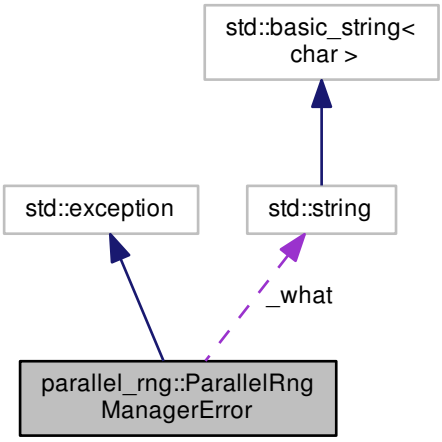
7.2 parallel_rng::ParallelRngManagerError Class Reference

`#include </home/travis/build/markjolah/ParallelRngManager/include/ParallelRng-Manager/ParallelRngManager.h>`

Inheritance diagram for parallel_rng::ParallelRngManagerError:



Collaboration diagram for parallel_rng::ParallelRngManagerError:



Public Member Functions

- ParallelRngManagerError (std::string what)
- const char * what () const noexceptoverride

Protected Attributes

- std::string _what

7.2.1 Detailed Description

Definition at line 60 of file ParallelRngManager.h.

7.2.2 Constructor & Destructor Documentation

7.2.2.1 parallel_rng::ParallelRngManagerError::ParallelRngManagerError (std::string *what*) [inline]

Definition at line 65 of file ParallelRngManager.h.

7.2.3 Member Function Documentation

7.2.3.1 const char* parallel_rng::ParallelRngManagerError::what ( ) const [inline], [override], [noexcept]

Definition at line 66 of file ParallelRngManager.h.

References _what.

7.2.4 Member Data Documentation

7.2.4.1 std::string parallel_rng::ParallelRngManagerError::_what [protected]

Definition at line 63 of file ParallelRngManager.h.

Referenced by what().

The documentation for this class was generated from the following file:

- ParallelRngManager.h

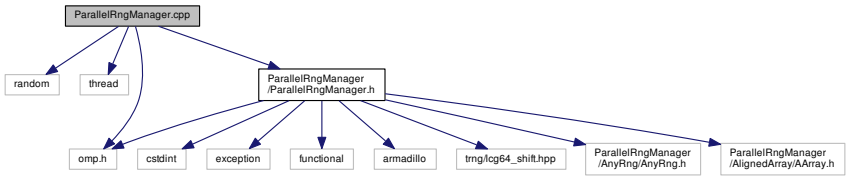
8 File Documentation

8.1 ParallelRngManager.cpp File Reference

Fast auto rng for parallel openmp code.

```
#include <random>
#include <thread>
#include "omp.h"
#include "ParallelRngManager/ParallelRngManager.h"
```

Include dependency graph for ParallelRngManager.cpp:



Namespaces

- parallel_rng

Functions

- SeedT parallel_rng::generate_seed ()
- IdxT parallel_rng::openmp_estimate_max_threads ()

  Use openmp to estimate the maximum number of threads that will be generated.

8.1.1 Detailed Description

Fast auto rng for parallel openmp code.

Author

Mark J. Olah (mjo@cs.unm DOT edu)

Date

2016-2017

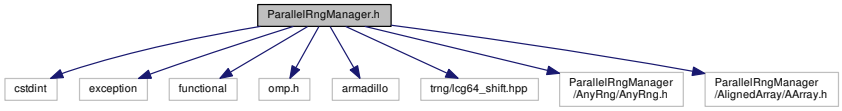
Definition in file ParallelRngManager.cpp.

8.2 ParallelRngManager.h File Reference

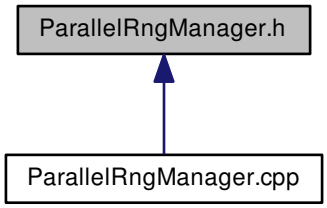
Adapts TRNG parallel RNG to armadillo, maintaining a per-thread RNG.

```
#include <cstdint>
#include <exception>
#include <functional>
#include <omp.h>
#include <armadillo>
#include <trng/lcg64_shift.hpp>
#include "ParallelRngManager/AnyRng/AnyRng.h"
#include "ParallelRngManager/AlignedArray/AArray.h"
```

Include dependency graph for ParallelRngManager.h:



This graph shows which files directly or indirectly include this file:



Classes

- class parallel_rng::ParallelRngManagerError
- class parallel_rng::ParallelRngManager< RngT, FloatT >

Namespaces

- parallel_rng

Macros

- #define DEBUG_ASSERT(...)
- #define ASSERT_SETUP(...)

Typedefs

- using parallel_rng::DefaultParallelRngT = trng::lcg64_shift

  Suggested default ParallelRNG type.
- using parallel_rng::SeedT = uint64_t

  Use the true random interface to generate a truly random seed.
- using parallel_rng::IdxT = arma::uword

Functions

- SeedT parallel_rng::generate_seed ()
- IdxT parallel_rng::openmp_estimate_max_threads ()

  Use openmp to estimate the maximum number of threads that will be generated.
- template<class RngT = DefaultParallelRngT, class FloatT = double>
  ParallelRngManager< RngT, FloatT > parallel_rng::make_parallel_rng_manager ()
- template<class RngT = DefaultParallelRngT, class FloatT = double>
  ParallelRngManager< RngT, FloatT > parallel_rng::make_parallel_rng_manager (SeedT seed)

Variables

- parallel_rng::rngs {num_threads,cache_alignment, RngT{seeder}}
- parallel_rng::norm_dist {num_threads,cache_alignment, NormalDistT{}}

8.2.1 Detailed Description

Adapts TRNG parallel RNG to armadillo, maintaining a per-thread RNG.

Author

Mark J. Olah (mjo@cs.unm DOT edu)

Date

2016-2017

Definition in file ParallelRngManager.h.

8.2.2 Macro Definition Documentation

8.2.2.1 #define ASSERT_SETUP(...)

Definition at line 45 of file ParallelRngManager.h.

8.2.2.2 #define DEBUG_ASSERT(...)

Definition at line 40 of file ParallelRngManager.h.

8.3 README.md File Reference

Index