Mappel

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1 MAPPEL

Mappel is an object-oriented image processing library for super-resolution localization of Gaussian point emitters in fluorescence microscopy applications.

- Mappel uses CMake and builds cross-platform for Linux and Windows 64-bit.
- Mappel has object-oriented interfaces in C++, Python, and Matlab
- Mappel uses OpenMP to parallelize operations over vectors of images or parameters
- Mappel is free-as-in-beer and free-as-in-speech! ([Apache-2.0](LICENSE))

Documentation

The Mappel Doxygen documentation can be build with the OPT_DOC CMake option and is also available on online:

- Mappel HTML Manual
- Mappel PDF Manual
- Mappel github repository

Background

Point emitter localization is a process of precisely estimating the sub-pixel location of a single point source emitter (molecule/protein) at effective resolutions 10-50 times smaller than the fundamental diffraction limit for optical microscopes. Operationally, this is the process of going from the blurry, noisy, pixelated images to the estimate of true emitter position and the estimate of the uncertainty in true position. Figure 1 shows the point emitter localization process visually utilizing realistic physical scales for a typical super-resolution fluorescence microscope configuration, and showing typical effective fitting resolution.

Figure 1: Effective fitting resolution in typical applications

Installation

Mappel uses the CMake build system, and is designed to be cross-compiled from linux to other platforms, primarily Win64, although future OSX support is planned.

Dependencies

Several standard numerical packages are required to build Mappel. Most distributions should have development versions of these packages which provide the include files and other necessary development files for the packages.

- *Armadillo* - A high-performance array library for C++.
- Boost
- BLAS
  - Requires support for 64-bit integers.
  - Netlib BLAS Reference
- LAPACK
  - Requires support for 64-bit integers.
  - Netlib LAPACK Reference

Note the OPT_BLAS_INT64 CMake option controls whether Armadillo uses BLAS and LAPACK libraries that use 64-bit interger indexing. Matlab uses 64-bit by default, so linking Mappel to Matlab MEX libraries requires this option enabled. Many linux systems only provide 32-bit integer versions of BLAS and Lapack, and the option can be disabled if Matlab support is not a concern and 64-bit support is difficult to provide.

External Projects

These packages are specialized CMake projects. If they are not currently installed on the development machines we use the AddExternalDependency.cmake which will automatically download, configure, build and install to the CMAKE_INSTALL_PREFIX, enabling their use through the normal CMake find_package() system.

- BacktraceException - A library to provide debugging output on exception calls. Important for Matlab debugging.
- ParallelRngManager - A simple manager for easily deploying a set of RNG parallelized over a set number of threads, using the TRNG parallel RNG library.
- PriorHessian - The PriorHessian library allows fast computation of log-likelihood and derivatives for composite priors.

Model classes

Mappel provides model objects that correspond to different fitting-modes (psf-models). Mappel's core is a C++ library libmappel.so that uses OpenMP to automatically parallelize localizations over multiple images. Mappel also provides detailed object-oriented interfaces for Python and Matlab, using the same concept of a Model class to represent each class of psf fitting models.

Computations available

- `llh` - log-likelihood (log of pdf)
- `rllh` - relative log-likelihood (log of pdf without constant terms)
- `grad` - derivative of log-likelihood (or equivalently of relative-llh)
- `grad2` - 2nd-derivative of log-likelihood
- `hessian` - hessian of log-likelihood

Design Notes

Static Polymorphism

The Mappel library is designed using static polymorphism (templates), and as such avoids virtual functions for small-grained tasks, and instead uses templates, which allow many small functions to be inlined. This aggressive inlining by the compiler produces log-likelihood, gradient, and hessian functions that are nearly as fast as hand-coded functions.

2 Install

Currently building has only been tested on linux hosts.

Mappel has been tested with modern GCC-7.2.0 as well as earlier GCC's to 4.9.4 (which is still required for Matlab integration). In order to maintain compatibility with gcc-4.9.4 and still use modern C++14 features we use the `-std=c++1y` GCC standard when compiling.

Dependencies

Several standard numerical packages are required to build Mappel. Most distributions should have development versions of these packages which provide the include files and other necessary development files for the packages.

- `Armadillo`
- `Boost`
- `TRNG`
- BLAS
  - Requires support for 64-bit integers.
  - `Netlib BLAS Reference`
- LAPACK
  - Requires support for 64-bit integers.
  - `Netlib LAPACK Reference`

Gentoo

Add to your `package.keywords`

```
1 sci-libs/lapack-reference int64
2 sci-libs/blas-reference int64
```

```
1 emerge -av armadillo boost lapack-reference blas-reference
```

For TRNG there is not a gentoo ebuild in the tree, we provide one at the `OlahGentooScienceOverlay`.

```
1 layman -o  https://github.com/markjolah/OlahScienceGentooOverlay/blob/master/layman.xml -f -a olah-science
2 emerge -av trng
```

External Projects

Mappel also depends on several small Github projects which for now are maintained in separate repositories.

- `BacktraceException` - A library to provide debugging output on exception calls. Important for Matlab debugging.
- `ParallelRngManager` - A simple manager for easily deploying a set of RNG parallelized over a set number of threads, using the TRNG parallel RNG library.
- `PriorHessian` - The PriorHessian library allows fast computation of log-likelihood and derivatives for composite priors.

If these libraries do not exist on the build system or at `CMAKE_INSTALL_PREFIX`, they are automatically downloaded, configured and installed as external dependencies during the CMake configure phase.

Normally the Github current versions of the external dependencies are used. To use the HEAD revision of a local git repository, the following Environment variables can be set:

- `BacktraceExceptionURL` - Local directory or git URL for the BacktraceException library [optional] Default to use the HEAD version from Github
- `ParallelRngManagerURL` - Local directory or git URL for the ParallelRngManager library
- `PriorHessianURL` - Local directory or git URL for the PriorHessian library

Build process

Linux

```
1 git clone https://github.com/markjolah/Mappel.git
2 cd Mappel
3 ./build.sh
```

On successful build the Mappel libraries, binaries, includes, and CMake modules are all installed to the `_install` dir.

Debugging

CMake variable `CMAKE_BUILD_TYPE=Debug` will configure the debug build and all libraries and executables will have a `.debug` suffix.

A convenience script exists to only build the debug versions of the libraries in the local `_build` and `_install` directories

```
1 ./build.debug.sh
```

Tips:

- Try running `VERBOSE=1 make` inside the `_build/Debug` directory to debug the build/link command lines generated by CMAKE.

Python support

Matlab support is enabled by setting the CMake option `-DOPT_PYTHON=1`. At the moment only python 3 is supported.

Several CMake variable can control for which python version modules are built.

- `MAPPEL_PYTHON_VERSIONS` - List of python X.Y versions seperated by ";" to build modules for (e.g., "3.↩ 4;3.5;3.6")
- `MAPPEL_PYTHON_EXECUTABLE` - Name or full path to python executable on the system for which to build (e.g., python3).

Mappel uses `pybind11` to compile modules for each Mappel Model class.

Python development workflow

The Mappel python package environment is created in the build tree at `build_dir/python`, as part of the CMake build process. There is a standard `setuptools` `setup.py` that can be used to build binary distributions and also to install to the local system.

The CMake install process will automatically install the python .egg using `setup.py` under the `CMAKE_INSTALL↩ _PREFIX` directory.

In order to be able to develop the code at the root `mappel/python/` git repository while running and testing the mappel package without having to `make install` on every small change to python code, we use the `developer mode` install option provided by setuptoools. In fact, we have made it even easier to use, by making an alias `localdevelop`

```
1 $ cd _build/Debug/python
2 $ python setup.py localdevelop
3 $ python -m mappel
```

Matlab support

Matlab support is enabled by setting the CMake option `MATLAB=on`. This brings in an additional external dependency,

- `MexIFace` - A cross-platform Matlab/C++ class-based interface wrapper for generating .mex files.

The following environment variables control the Matlab build process

- `MexIFaceURL`: Local directory or git URL for the MexIface library (Matlab Support). [optional] Default to use the `HEAD` version from Github
- `MATLAB_LIBS_ROOT`: [Optional] Local path to find Matlab core shared libraries to link against (overrides default search paths). Must contain subdirectory structure `($MATLAB_ARCH)//{bin,extern}`. `MATLAB_ARCH` is [glnxa64, maci64, win64].
- `MATLAB_ROOT_GLNXA64`: Necessary for Matlab. Location of the Matlab `glnxa64` version to link against.

Cross-building to Win64

The following Environment variables control the Win64 cross-build environment necessary to compile win64 binaries

- `MXE_ROOT` Local directory root of the MXE Win64 cross environment. Necessary For Win64 cross-compiling only.
- `MATLAB_ROOT_WIN64` Necessary for Matlab on Win64 cross build. Location of the Matlab `win64` version to link against.

Cross-building to OSX

- `OSXCROSS_ROOT`: Local directory root of the OSXCross OSX 64-bit cross environment. Necessary for OSX cross-compiling only.
- `MATLAB_ROOT_MACI64`: Necessary for Matlab on OSX cross build. Location of the Matlab `maci64` version to link against.

3 Namespace Index

3.1 Namespace List

Here is a list of all namespaces with brief descriptions:

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4 Hierarchical Index

4.1 Class Hierarchy

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

mappel::Estimator< Model > 100

mappel::ThreadedEstimator< Model > 760

mappel::CGaussHeuristicEstimator< Model > 87

mappel::CGaussMLE< Model > 93

mappel::HeuristicEstimator< Model > 506

mappel::IterativeMaximizer< Model > 526

mappel::NewtonDiagonalMaximizer< Model > 653

mappel::NewtonMaximizer< Model > 665

mappel::QuasiNewtonMaximizer< Model > 717

mappel::TrustRegionMaximizer< Model > 767

mappel::SimulatedAnnealingMaximizer< Model > 729

mappel::ImageFormat1DBase 513

mappel::Gauss1DModel 162

mappel::Gauss1DMAP 106

mappel::Gauss1DMLE 134

mappel::Gauss2DsxyMAP 456

mappel::Gauss1DsModel 245

mappel::Gauss1DsMAP 189

mappel::Gauss1DsMLE 217

mappel::PoissonNoise1DObjective 699

mappel::Gauss1DMAP 106

mappel::Gauss1DMLE 134

mappel::Gauss1DsMAP 189

mappel::Gauss1DsMLE 217

mappel::Gauss2DsxyMAP 456

ImageFormat1DBase

PoissonGaussianNoise2DObjective< ModelBase > 697

mappel::ImageFormat2DBase 519

mappel::Gauss2DModel 332

mappel::Gauss2DMAP 272

mappel::Gauss2DMLE 302

mappel::Gauss2DsModel 425

mappel::Gauss2DsMAP 361

mappel::Gauss2DsMLE 393

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mappel::PoissonNoise2DObjective 707

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mappel::MAPEstimator 539
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mappel::Gauss1DsMAP 189
mappel::Gauss2DMAP 272
mappel::Gauss2DsMAP 361
mappel::Gauss2DsxyMAP 456
mappel::MCMCAdaptor1D 562
mappel::MLEstimator 637
mappel::Gauss1DMLE 134
mappel::Gauss1DsMLE 217
mappel::Gauss2DMLE 302

mappel::Gauss2DsMLE 393

mappel::PriorMAP1DObjective 714

mappel::Gauss1DModel::Stencil 736

mappel::Gauss1DsModel::Stencil 740

mappel::Gauss2DsxyModel::Stencil 744

mappel::Gauss2DsModel::Stencil 749

mappel::Gauss2DModel::Stencil 755

5 Class Index

5.1 Class List

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

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mappel::ArraySizeError
Array is not of the right size 86

mappel::CGaussHeuristicEstimator< Model > 87

mappel::CGaussMLE< Model > 93

mappel::Estimator< Model > 100

mappel::Gauss1DMAP
A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective 106

mappel::Gauss1DMLE
A 1D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective 134

mappel::Gauss1DModel
A base class for 1D Gaussian PSF with a fixed sigma (standard dev.) 162

mappel::Gauss1DsMAP
A 1D Gaussian with variable PSF sigma under an Poisson read noise assumption and MAP Objective 189

mappel::Gauss1DsMLE
A 1D Gaussian with variable PSF under an Poisson noise assumption and maximum-likelihood estimator 217

mappel::Gauss1DsModel
Base class for 1D Gaussian PSF with variable Gaussian sigma (standard deviation) measured in units of pixels 245

mappel::Gauss2DMAP
A 2D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective 272

mappel::Gauss2DMLE
A 2D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective 302

mappel::Gauss2DModel
A base class for 2D Gaussian PSF with fixed but possibly asymmetric sigma 332

mappel::Gauss2DsMAP
A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum a-posteriori objective 361

mappel::Gauss2DsMLE
A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum-likelihood objective 393

mappel::Gauss2DsModel
A base class for 2D Gaussian PSF where the gaussian sigma is controlled by a single scalar parameter which is called sigma_ratio. The size of the gaussian psf is sigma_ratio∗psf_sigma, where psf_sigma is considered as a vector [psf_sigmaX, psf_sigmaY] 425

mappel::Gauss2DsxyMAP
A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective 456

mappel::Gauss2DsxyModel
A base class for 2D Gaussian PSF with axis-aligned gaussian with free parameters for both sigma↩ _x and sigma_y. Gaussian sigma parameters sigma_x and sigma_y are measured in units of pixels. The model has 6 parameters, [x,y,I,bg,sigma_x,sigma_y] 483

mappel::HeuristicEstimator< Model > 506

mappel::ImageFormat1DBase
A virtual base class for 2D image localization objectives 513

mappel::ImageFormat2DBase
A virtual base class for 2D image localization objectives 519

mappel::IterativeMaximizer< Model > 526

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mappel::MLEstimator
A Mixin class to configure a for MLE estimation (null prior) 637

mappel::ModelBoundsError
Access outside the model bounds is attempted 652

mappel::NewtonDiagonalMaximizer< Model > 653

mappel::NewtonMaximizer< Model > 665

mappel::NotImplementedError
Feature not yet implemented 678

mappel::NumericalError
Expected numerical condition does not hold 678

omp_exception_catcher::impl_::OMPExceptionCatcher< IntType > 679

mappel::ParameterValueError
Parameter value is not valid 681

mappel::PointEmitterModel
A virtual Base type for point emitter localization models 682

PoissonGaussianNoise2DObjective< ModelBase >
A Base type for point emitter localization models that use 2d images 697

mappel::PoissonNoise1DObjective
A base class for 1D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel 699

mappel::PoissonNoise2DObjective
A base class for 2D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel 707

mappel::PriorMAP1DObjective
A Mixin class to configure a Gauss1DModel for MAP estimation (default 1D prior) 714

mappel::QuasiNewtonMaximizer< Model > 717

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Stencil for 1D variable-sigma models 740

mappel::Gauss2DsxyModel::Stencil
Stencil for 2D free-sigma (astigmatic) models 744

mappel::Gauss2DsModel::Stencil
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mappel::Gauss2DModel::Stencil
Stencil for 2D fixed-sigma models 755

mappel::ThreadedEstimator< Model > 760

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6.1 File List

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Gauss1DModel.cpp
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Gauss2DMAP.cpp
The class definition and template Specializations for Gauss2DMAP 794

Gauss2DMAP.h
The class declaration and inline and templated functions for Gauss2DMAP 794

Gauss2DMLE.cpp
The class definition and template Specializations for Gauss2DMLE 795

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The class declaration and inline and templated functions for Gauss2DMLE 795

Gauss2DModel.cpp
The class definition and template Specializations for Gauss2DModel 796

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7 Namespace Documentation

7.1 mappel Namespace Reference

Namespaces

- mcmc

- methods

  Templated functions for operating on a PointEmitterModel.

Classes

- struct ArrayShapeError

  Array is not of the right dimensionality.
- struct ArraySizeError

  Array is not of the right size.
- class CGaussHeuristicEstimator
- class CGaussMLE
- class Estimator
- class Gauss1DMAP

  A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.
- class Gauss1DMLE

  A 1D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective.
- class Gauss1DModel

  A base class for 1D Gaussian PSF with a fixed sigma (standard dev.)
- class Gauss1DsMAP

  A 1D Gaussian with variable PSF sigma under an Poisson read noise assumption and MAP Objective.
- class Gauss1DsMLE

  A 1D Gaussian with variable PSF under an Poisson noise assumption and maximum-likelihood estimator.
- class Gauss1DsModel

  Base class for 1D Gaussian PSF with variable Gaussian sigma (standard deviation) measured in units of pixels.
- class Gauss2DMAP

  A 2D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.
- class Gauss2DMLE

  A 2D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective.
- class Gauss2DModel

  A base class for 2D Gaussian PSF with fixed but possibly asymmetric sigma.
- class Gauss2DsMAP

  A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum a-posteriori objective.
- class Gauss2DsMLE

  A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum-likelihood objective.
- class Gauss2DsModel

  A base class for 2D Gaussian PSF where the gaussian sigma is controlled by a single scalar parameter which is called sigma_ratio. The size of the gaussian psf is sigma_ratio∗psf_sigma, where psf_sigma is considered as a vector [psf_↩ sigmaX, psf_sigmaY].
- class Gauss2DsxyMAP

  A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.
- class Gauss2DsxyModel

  A base class for 2D Gaussian PSF with axis-aligned gaussian with free parameters for both sigma_x and sigma_↩ y. Gaussian sigma parameters sigma_x and sigma_y are measured in units of pixels. The model has 6 parameters, [x,y,I,bg,sigma_x,sigma_y].
- class HeuristicEstimator
- class ImageFormat1DBase

  A virtual base class for 2D image localization objectives.

- class ImageFormat2DBase

  A virtual base class for 2D image localization objectives.
- class IterativeMaximizer
- struct LogicalError

  Failure of code or algorithm logic.
- class MAPEstimator

  A Mixin class to configure a for MLE estimation (null prior).
- class MCMCAdaptor1D
- class MCMCAdaptor1Ds
- class MCMCAdaptor2D
- class MCMCAdaptor2Ds
- class MCMCAdaptorBase
- class MLEstimator

  A Mixin class to configure a for MLE estimation (null prior).
- struct ModelBoundsError

  Access outside the model bounds is attempted.
- class NewtonDiagonalMaximizer
- class NewtonMaximizer
- struct NotImplementedError

  Feature not yet implemented.
- struct NumericalError

  Expected numerical condition does not hold.
- struct ParameterValueError

  Parameter value is not valid.
- class PointEmitterModel

  A virtual Base type for point emitter localization models.
- class PoissonNoise1DObjective

  A base class for 1D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel.
- class PoissonNoise2DObjective

  A base class for 2D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel.
- class PriorMAP1DObjective

  A Mixin class to configure a Gauss1DModel for MAP estimation (default 1D prior).
- class QuasiNewtonMaximizer
- class SimulatedAnnealingMaximizer
- class ThreadedEstimator
- class TrustRegionMaximizer

Typedefs

- using ParallelRngGeneratorT = trng::lcg64_shift
- using ParallelRngManagerT = parallel_rng::ParallelRngManager< ParallelRngGeneratorT >
- using RngSeedT = parallel_rng::SeedT
- using UniformDistT = std::uniform_real_distribution< double >
- using BoolT = uint16_t

- using BoolVecT = arma::Col< uint16_t >
- using IdxT = arma::uword
- using IdxVecT = arma::Col< IdxT >
- using IdxMatT = arma::Mat< IdxT >
- using VecT = arma::vec
- using MatT = arma::mat
- using CubeT = arma::cube
- using VecFieldT = arma::field< VecT >
- using StatsT = std::map< std::string, double >
- using StringVecT = std::vector< std::string >
- template<class ModelT , class ModelBaseT >
  using EnableIfSubclassT = typename std::enable_if< std::is_base_of< ModelBaseT, ModelT >::value, void >::type
- template<class ReturnT , class ModelT , class ModelBaseT >
  using ReturnIfSubclassT = typename std::enable_if< std::is_base_of< ModelBaseT, ModelT >::value, ReturnT >::type
- template<class Model >
  using ImageCoordT = typename Model::ImageCoordT
- template<class Model >
  using ImagePixelT = typename Model::ImagePixelT
- template<class Model >
  using ParamT = typename Model::ParamT
- template<class Model >
  using ParamVecT = typename Model::ParamVecT
- template<class Model >
  using ImageT = typename Model::ImageT
- template<class Model >
  using ModelDataT = typename Model::ModelDataT
- template<class Model >
  using StencilT = typename Model::Stencil
- template<class Model >
  using ImageStackT = typename Model::ImageStackT
- template<class Model >
  using ModelDataStackT = typename Model::ModelDataStackT
- template<class Model >
  using StencilVecT = typename Model::StencilVecT
- using MappelError = backtrace_exception::BacktraceException

Functions

- const char * lambda_term_color (int size, int Lidx)
- ostream & print_centered_title (ostream &out, char fill, int width, const char *title=nullptr)
- ostream & print_labeled_image (ostream &out, const arma::mat &im, const char *title, const char *color)
- template<>
  std::ostream & print_image (std::ostream &out, const arma::vec &im)
- template<>
  std::ostream & print_image (std::ostream &out, const arma::mat &im)
- template<>
  std::ostream & print_image (std::ostream &out, const arma::cube &im)
- std::ostream & operator<< (std::ostream &out, const Gauss1DModel::Stencil &s)
- std::ostream & operator<< (std::ostream &out, const Gauss1DsModel::Stencil &s)

- std::ostream & operator<< (std::ostream &out, const Gauss2DModel::Stencil &s)
- std::ostream & operator<< (std::ostream &out, const Gauss2DsModel::Stencil &s)
- void copy_Usym_mat (arma::mat &usym)
- void copy_Usym_mat_stack (arma::cube &usym_stack)
- void copy_Lsym_mat (arma::mat &lsym)
- void cholesky_make_negative_definite (arma::mat &m)
- void cholesky_make_positive_definite (arma::mat &m)
- bool is_negative_definite (const arma::mat &usym)
- bool is_positive_definite (const arma::mat &usym)
- bool is_symmetric (const arma::mat &A)
- void cholesky_convert_lower_triangular (arma::mat &chol)
- void cholesky_convert_full_matrix (arma::mat &chol)
- bool cholesky (arma::mat &A)
- bool modified_cholesky (arma::mat &A)
- arma::vec cholesky_solve (const arma::mat &C, const arma::vec &b)
- double normal_quantile_twosided (double confidence)
- double normal_quantile_onesided (double confidence)
- void fill_gaussian_stencil (int size, double stencil[ ], double sigma)
- double gaussian_convolution (int x, int y, const MatT &data, const VecT &Xstencil, const VecT &Ystencil)
- void estimate_gaussian_2Dmax (const MatT &data, const VecT &Xstencil, const VecT &Ystencil, int max_pos[ ], double &min_val)
- void refine_gaussian_2Dmax (const MatT &data, const VecT &Xstencil, const VecT &Ystencil, int max_pos[ ])
- double gaussian_3D_convolution (int x, int y, int z, const CubeT &data, const VecFieldT &stencils)
- void estimate_gaussian_3Dmax (const CubeT &data, const VecFieldT &stencils, int max_pos[ ], double &min_val)
- void refine_gaussian_3Dmax (const CubeT &data, const VecFieldT &stencils, int max_pos[ ])
- double estimate_background (const MatT &im, const MatT &unit_model_im, double min_bg)
- double estimate_intensity (const MatT &im, const MatT &unit_model_im, double bg)
- double estimate_background (const CubeT &im, const CubeT &unit_model_im)
- double estimate_intensity (const CubeT &im, const CubeT &unit_model_im, double bg)
- void enable_all_cpus ()
- bool istarts_with (const char *s, const char *pattern)
- bool istarts_with (const std::string &str, const char *pattern)
- const char * icontains (const char *s, const char *pattern)
- int maxidx (const VecT &v)
- std::ostream & operator<< (std::ostream &out, const StatsT &stats)
- template<class ImageT >
  std::ostream & print_image (std::ostream &out, const ImageT &im)
- template<class Vec >
  std::ostream & print_vec_row (std::ostream &out, const Vec &vec, const char *header, int header_width, const char *color=nullptr)
- template<class Model >
  std::ostream & operator<< (std::ostream &out, Estimator< Model > &estimator)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DModel, Model >::value, ParamT< Model > >::type cgauss_↩ heuristic_compute_estimate (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DModel, Model >::value, ParamT< Model > >::type cgauss_↩ compute_estimate (Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations)

- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DModel, Model >::value, ParamT< Model > >::type cgauss_↩ compute_estimate_debug (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations, ParamVecT< Model > &sequence)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsModel, Model >::value, ParamT< Model > >::type cgauss_↩ heuristic_compute_estimate (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsModel, Model >::value, ParamT< Model > >::type cgauss_↩ compute_estimate (Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsModel, Model >::value, ParamT< Model > >::type cgauss_↩ compute_estimate_debug (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations, ParamVecT< Model > &sequence)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsxyModel, Model >::value, ParamT< Model > >::type cgauss_↩ heuristic_compute_estimate (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsxyModel, Model >::value, ParamT< Model > >::type cgauss_↩ compute_estimate (Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsxyModel, Model >::value, ParamT< Model > >::type cgauss_↩ compute_estimate_debug (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations, ParamVecT< Model > &sequence)
- template<class Model , typename = EnableIfSubclassT<Model,PointEmitterModel>>
  std::ostream & operator<< (std::ostream &out, const Model &model)
- template<class RngT >
  IdxT generate_poisson_small (RngT &rng, double mu)

  Genrates a single poisson disributed int from distribution with mean mu.
- template<class RngT >
  IdxT generate_poisson_large (RngT &rng, double mu)
- template<class RngT >
  double generate_poisson (RngT &rng, double mu)
- template<class Model >
  void sample_prior_stack (Model &model, typename Model::ParamVecT &theta_stack)

  Parallel sampling of the model prior.
- template<class Model >
  void model_image_stack (const Model &model, const typename Model::ParamVecT &theta_stack, typename Model::ImageStackT &image_stack)

  Parallel computation of the model image.
- template<class Model >
  void simulate_image_stack (const Model &model, const typename Model::ParamVecT &theta_stack, typename Model::ImageStackT &image_stack)

  Parallel simulation of images from one or more theta.
- template<class Model >
  void log_likelihood_stack (const Model &model, const typename Model::ImageT &image, const typename Model::ParamVecT &theta_stack, VecT &llh_stack)

  Parallel log_likelihood calculations for a single image.

- template<class Model >
  void log_likelihood_stack (const Model &model, const typename Model::ImageStackT &image_stack, const typename Model::ParamVecT &theta_stack, VecT &llh_stack)

  Parallel log_likelihood calculations for a stack of images.
- template<class Model >
  void model_grad_stack (const Model &model, const typename Model::ImageStackT &image_stack, const typename Model::ParamVecT &theta_stack, typename Model::ParamVecT &grad_stack)

  Parallel model gradient calculations for a stack of images.
- template<class Model >
  void model_hessian_stack (const Model &model, const typename Model::ImageStackT &image_stack, const typename Model::ParamVecT &theta_stack, CubeT &hessian_stack)

  Parallel model Hessian calculations for a stack of images.
- template<class Model >
  void model_positive_hessian_stack (const Model &model, const typename Model::ImageStackT &image_stack, const typename Model::ParamVecT &theta_stack, CubeT &hessian_stack)

  Parallel model positive-definite Hessian approximation calculations for a stack of images.
- template<class Model >
  void cr_lower_bound_stack (const Model &model, const typename Model::ParamVecT &theta_stack, typename Model::ParamVecT &crlb_stack)
- template<class Model >
  void fisher_information_stack (const Model &model, const typename Model::ParamVecT &theta_stack, CubeT &fisherI_stack)
- double gauss_norm (double sigma)
- void fill_d_stencil (int size, double stencil[ ], double theta_x)
- void fill_G_stencil (int size, double stencil[ ], const double dx[ ], double theta_sigma)
- void fill_X_stencil (int size, double stencil[ ], const double dx[ ], double theta_sigma)
- void fill_DX_stencil (int size, double stencil[ ], const double Gx[ ], double theta_sigma)
- void fill_DXS_stencil (int size, double stencil[ ], const double dx[ ], const double Gx[ ], double theta_sigma)
- void fill_DXS2_stencil (int size, double stencil[ ], const double dx[ ], const double Gx[ ], const double DXS[ ], double theta_sigma)
- void fill_DXSX_stencil (int size, double stencil[ ], const double dx[ ], const double Gx[ ], const double DX[ ], double theta_sigma)
- VecT make_d_stencil (int size, double theta_x)
- VecT make_G_stencil (int size, const VecT &dx, double theta_sigma)
- VecT make_X_stencil (int size, const VecT &dx, double theta_sigma)
- VecT make_DX_stencil (int size, const VecT &Gx, double theta_sigma)
- VecT make_DXS_stencil (int size, const VecT &dx, const VecT &Gx, double theta_sigma)
- VecT make_DXS2_stencil (int size, const VecT &dx, const VecT &Gx, const VecT &DXS, double theta_sigma)
- VecT make_DXSX_stencil (int size, const VecT &dx, const VecT &Gx, const VecT &DX, double theta_sigma)
- VecT make_gaussian_stencil (int size, double sigma)
- double poisson_log_likelihood (double model_val, double data_val)
- double relative_poisson_log_likelihood (double model_val, double data_val)
- double check_lower_bound_hyperparameter (const char *name, double value, double lower_bound)
- double check_positive_hyperparameter (const char *name, double value, double hyperprior_epsilon=1E-6)
- double check_unit_hyperparameter (const char *name, double value, double hyperprior_epsilon=1E-6)
- double log_prior_beta_const (double beta)
- double log_prior_beta2_const (double beta0, double beta1)
- double log_prior_gamma_const (double kappa, double mean)
- double log_prior_pareto_const (double alpha, double min)
- double log_prior_normal_const (double sigma)
- double rllh_beta_prior (double beta, double v, double max=1., double min=0.)

- double rllh_beta2_prior (double beta0, double beta1, double v, double max=1., double min=0.)
- double rllh_gamma_prior (double kappa, double mean, double v)
- double rllh_pareto_prior (double alpha, double v)
- double rllh_normal_prior (double mu, double sigma)
- double beta_prior_grad (double beta, double v, double max=1., double min=0.)
- double beta2_prior_grad (double beta0, double beta1, double v, double max=1., double min=0.)
- double gamma_prior_grad (double kappa, double mean, double v)
- double pareto_prior_grad (double alpha, double v)
- double normal_prior_grad (double mu, double sigma)
- double beta_prior_grad2 (double beta, double v, double max=1., double min=0.)
- double beta2_prior_grad2 (double beta0, double beta1, double v, double max=1., double min=0.)
- double gamma_prior_grad2 (double kappa, double v)
- double pareto_prior_grad2 (double alpha, double v)
- double normal_prior_grad (double sigma)
- double rllh_normal_prior (double mu, double sigma, double v)
- double normal_prior_grad (double mu, double sigma, double v)
- double normal_prior_grad2 (double sigma)
- template<typename T >
  int sgn (T val)

  sign (signum) function: -1/0/1
- template<typename T >
  T square (T x)
- double restrict_value_range (double val, double minval, double maxval)
- template<typename T , typename... Args>
  std::unique_ptr< T > make_unique (Args &&...args)

Variables

- const char * TERM_BLACK ="1;30"
- const char * TERM_RED ="1;31"
- const char * TERM_GREEN ="1;32"
- const char * TERM_YELLOW ="1;33"
- const char * TERM_BLUE ="1;34"
- const char * TERM_MAGENTA ="1;35"
- const char * TERM_CYAN ="1;36"
- const char * TERM_WHITE ="1;37"
- const char * TERM_DIM_BLACK ="0;30"
- const char * TERM_DIM_RED ="0;31"
- const char * TERM_DIM_GREEN ="0;32"
- const char * TERM_DIM_YELLOW ="0;33"
- const char * TERM_DIM_BLUE ="0;34"
- const char * TERM_DIM_MAGENTA ="0;35"
- const char * TERM_DIM_CYAN ="0;36"
- const char * TERM_DIM_WHITE ="0;37"
- ParallelRngManagerT rng_manager

7.1.1 Detailed Description

All models will call for maximization through this virtual function. All non-GPU based maximizers will use this version which spawns threads using a non-virual entry point member function Maximizer::thread_entry. GPU-based maximizers will want to do something custom, so they will declare their own virtual maximize_stack.

It is also because of the GPU-based mamixmizers that we are putting initilization, and CRLB/LLH calculations in here even though the Model knows how to do them.

We expect that those methods will need to also be paralellized and the GPU will need custom code, and the threaded CPU versions will want to also compute those in parallel, so in order to have a consitent call interface to the Maximizer classes, we put the CRLB/LLH and initialization work within the the maximize_stack method.

7.1.2 Typedef Documentation

7.1.2.1 using mappel::BoolT = typedef uint16_t

Definition at line 19 of file util.h.

7.1.2.2 using mappel::BoolVecT = typedef arma::Col<uint16_t>

Definition at line 20 of file util.h.

7.1.2.3 using mappel::CubeT = typedef arma::cube

A type to represent floating-point data cubes

Definition at line 26 of file util.h.

7.1.2.4 template<class ModelT , class ModelBaseT > using mappel::EnableIfSubclassT = typedef typename std::enable_if<std::is_base_of<ModelBaseT,ModelT>::value,void>::type

Definition at line 33 of file util.h.

7.1.2.5 using mappel::IdxMatT = typedef arma::Mat<IdxT>

A type to represent integer data arrays

Definition at line 23 of file util.h.

7.1.2.6 using mappel::IdxT = typedef arma::uword

Definition at line 21 of file util.h.

7.1.2.7 using mappel::IdxVecT = typedef arma::Col<IdxT>

A type to represent integer data arrays

Definition at line 22 of file util.h.

7.1.2.8 template<class Model > using mappel::ImageCoordT = typedef typename Model::ImageCoordT

Definition at line 38 of file util.h.

7.1.2.9 template<class Model > using mappel::ImagePixelT = typedef typename Model::ImagePixelT

Definition at line 39 of file util.h.

7.1.2.10 template<class Model > using mappel::ImageStackT = typedef typename Model::ImageStackT

Definition at line 47 of file util.h.

7.1.2.11 template<class Model > using mappel::ImageT = typedef typename Model::ImageT

Definition at line 43 of file util.h.

7.1.2.12 using mappel::MappelError = typedef backtrace_exception::BacktraceException

Definition at line 60 of file util.h.

7.1.2.13 using mappel::MatT = typedef arma::mat

A type to represent floating-point data matricies

Definition at line 25 of file util.h.

7.1.2.14 template<class Model > using mappel::ModelDataStackT = typedef typename Model::ModelDataStackT

Definition at line 48 of file util.h.

7.1.2.15 template<class Model > using mappel::ModelDataT = typedef typename Model::ModelDataT

Definition at line 44 of file util.h.

7.1.2.16 using mappel::ParallelRngGeneratorT = typedef trng::lcg64_shift

Definition at line 21 of file rng.h.

7.1.2.17 using mappel::ParallelRngManagerT = typedef parallel_rng::ParallelRngManager<ParallelRngGeneratorT>

Definition at line 22 of file rng.h.

7.1.2.18 template<class Model > using mappel::ParamT = typedef typename Model::ParamT

Definition at line 41 of file util.h.

7.1.2.19 template<class Model > using mappel::ParamVecT = typedef typename Model::ParamVecT

Definition at line 42 of file util.h.

7.1.2.20 template<class ReturnT , class ModelT , class ModelBaseT > using mappel::ReturnIfSubclassT = typedef typename std::enable_if<std::is_base_of<ModelBaseT,ModelT>::value,ReturnT>::type

Definition at line 36 of file util.h.

7.1.2.21 using mappel::RngSeedT = typedef parallel_rng::SeedT

Definition at line 23 of file rng.h.

7.1.2.22 using mappel::StatsT = typedef std::map<std::string,double>

A convenient form for reporting dictionaries of named FP data to matlab

Definition at line 28 of file util.h.

7.1.2.23 template<class Model > using mappel::StencilT = typedef typename Model::Stencil

Definition at line 45 of file util.h.

7.1.2.24 template<class Model > using mappel::StencilVecT = typedef typename Model::StencilVecT

Definition at line 49 of file util.h.

7.1.2.25 using mappel::StringVecT = typedef std::vector<std::string>

Definition at line 29 of file util.h.

7.1.2.26 using mappel::UniformDistT = typedef std::uniform_real_distribution<double>

Definition at line 24 of file rng.h.

7.1.2.27 using mappel::VecFieldT = typedef arma::field<VecT>

Definition at line 27 of file util.h.

7.1.2.28 using mappel::VecT = typedef arma::vec

A type to represent floating-point data arrays

Definition at line 24 of file util.h.

7.1.3 Function Documentation

7.1.3.1 double mappel::beta2_prior_grad (double *beta0,* double *beta1,* double *v,* double *max* = 1., double *min* = 0.) [inline]

Definition at line 314 of file stencil.h.

7.1.3.2 double mappel::beta2_prior_grad2 (double *beta0,* double *beta1,* double *v,* double *max* = 1., double *min* = 0.) [inline]

Definition at line 347 of file stencil.h.

7.1.3.3 double mappel::beta_prior_grad (double *beta,* double *v,* double *max* = 1., double *min* = 0.) [inline]

Definition at line 307 of file stencil.h.

Referenced by mappel::PriorMAP1DObjective::prior_grad_update().

7.1.3.4 double mappel::beta_prior_grad2 (double *beta,* double *v,* double *max* = 1., double *min* = 0.) [inline]

Definition at line 339 of file stencil.h.

Referenced by mappel::PriorMAP1DObjective::prior_grad2_update(), and mappel::PriorMAP1DObjective::prior_hess↩_update().

7.1.3.5 template<class Model > std::enable_if<std::is_base_of<Gauss2DModel,Model>::value, ParamT<Model> >::type mappel::cgauss_compute_estimate (Model & *model,* const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* int *max_iterations*)

Definition at line 223 of file Gauss2DModel.h.

References mappel::Gauss2DModel::psf_sigma, and mappel::ImageFormat2DBase::size.

Referenced by mappel::CGaussMLE< Model >::compute_estimate().

7.1.3.6 template<class Model > std::enable_if<std::is_base_of<Gauss2DsxyModel,Model>::value, ParamT<Model> >::type mappel::cgauss_compute_estimate (Model & *model,* const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* int *max_iterations*)

Definition at line 251 of file Gauss2DsxyModel.h.

References mappel::ImageFormat2DBase::size.

7.1.3.7 template<class Model > std::enable_if<std::is_base_of<Gauss2DsModel,Model>::value, ParamT<Model> >::type mappel::cgauss_compute_estimate (Model & *model,* const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* int *max_iterations*)

Definition at line 253 of file Gauss2DsModel.h.

References mappel::ImageFormat2DBase::size.

7.1.3.8 template<class Model > std::enable_if<std::is_base_of<Gauss2DModel,Model>::value, ParamT<Model> >::type mappel::cgauss_compute_estimate_debug (const Model & *model,* const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* int *max_iterations,* ParamVecT< Model > & *sequence*)

Definition at line 238 of file Gauss2DModel.h.

References mappel::Gauss2DModel::psf_sigma, and mappel::ImageFormat2DBase::size.

Referenced by mappel::CGaussMLE< Model >::compute_estimate_debug().

7.1.3.9 template<class Model > std::enable_if<std::is_base_of<Gauss2DsxyModel,Model>::value, ParamT<Model> >::type mappel::cgauss_compute_estimate_debug (const Model & *model,* const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* int *max_iterations,* ParamVecT< Model > & *sequence*)

Definition at line 266 of file Gauss2DsxyModel.h.

References mappel::ImageFormat2DBase::size.

7.1.3.10 template<class Model > std::enable_if<std::is_base_of<Gauss2DsModel,Model>::value, ParamT<Model> >::type mappel::cgauss_compute_estimate_debug (const Model & *model,* const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* int *max_iterations,* ParamVecT< Model > & *sequence*)

Definition at line 268 of file Gauss2DsModel.h.

References mappel::ImageFormat2DBase::size.

7.1.3.11 template<class Model > std::enable_if<std::is_base_of<Gauss2DModel,Model>::value,ParamT<Model> >::type mappel::cgauss_heuristic_compute_estimate (const Model & *model,* const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*)

Definition at line 209 of file Gauss2DModel.h.

References mappel::Gauss2DModel::psf_sigma, and mappel::ImageFormat2DBase::size.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_↩ estimate(), and mappel::CGaussMLE< Model >::compute_estimate_debug().

7.1.3.12 template<class Model > std::enable_if<std::is_base_of<Gauss2DsxyModel,Model>::value, ParamT<Model> >::type mappel::cgauss_heuristic_compute_estimate (const Model & *model,* const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*)

Definition at line 237 of file Gauss2DsxyModel.h.

References mappel::ImageFormat2DBase::size.

7.1.3.13 template<class Model > std::enable_if<std::is_base_of<Gauss2DsModel,Model>::value, ParamT<Model> >::type mappel::cgauss_heuristic_compute_estimate (const Model & *model,* const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*)

Definition at line 239 of file Gauss2DsModel.h.

References mappel::ImageFormat2DBase::size.

7.1.3.14 double mappel::check_lower_bound_hyperparameter (const char * *name,* double *value,* double *lower_bound*)

7.1.3.15 double mappel::check_positive_hyperparameter (const char * *name,* double *value,* double *hyperprior_epsilon* = 1E-6)

7.1.3.16 double mappel::check_unit_hyperparameter (const char * *name,* double *value,* double *hyperprior_epsilon* = 1E-6)

7.1.3.17 bool mappel::cholesky (arma::mat & *usym*)

Parameters

usym	An upper triangular symmetric matrix stored in a full matrix format. This matrix will be overwritten with the upper triangle and diagonal elements of the modified cholesky decomposition.

Returns

true if usym was positive semi-definite. If false then Usym is left in arbitrary corrupted state.

Definition at line 97 of file numerical.cpp.

Referenced by is_positive_definite(), mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

7.1.3.18 void mappel::cholesky_convert_full_matrix (arma::mat & *chol*)

Convert matrix in internal cholesky format into a full matrix M = L*L'

Definition at line 82 of file numerical.cpp.

References copy_Usym_mat().

Referenced by cholesky_make_negative_definite(), and cholesky_make_positive_definite().

7.1.3.19 void mappel::cholesky_convert_lower_triangular (arma::mat & *chol*)

Convert matrix in internal cholesky format into a lower triangular matrix L where M = L*L'

Definition at line 71 of file numerical.cpp.

Referenced by mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton().

7.1.3.20 void mappel::cholesky_make_negative_definite (arma::mat & *m*)

Modify m inplace using modfied choslesky decomposition to ensure m is negative definite

Definition at line 38 of file numerical.cpp.

References cholesky_convert_full_matrix(), and modified_cholesky().

Referenced by mappel::methods::objective::negative_definite_hessian().

7.1.3.21 void mappel::cholesky_make_positive_definite (arma::mat & *m*)

Modify m inplace using modfied choslesky decomposition to ensure m is positive definite

Definition at line 46 of file numerical.cpp.

References cholesky_convert_full_matrix(), and modified_cholesky().

7.1.3.22 arma::vec mappel::cholesky_solve (const arma::mat & *C*, const arma::vec & *b*)

Given a matrix in modified cholesky format and a vector solve the linear system C x = b.

Parameters

C	A matrix in lower modified cholesky format
b	A vector representing the right hand side of the linear system.

Returns

x - the solution to the linear system

Definition at line 184 of file numerical.cpp.

Referenced by mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

7.1.3.23 void mappel::copy_Lsym_mat (arma::mat & *lsym*)

Convert symmetric matrix stored as lower triangular to full Matrix Assuming lsym is the main diagonal and lower triangle of a symmertic matrix, fill in the upper triangle by copying the lowerr triangle. This operation modifies the matrix.

Definition at line 30 of file numerical.cpp.

7.1.3.24 void mappel::copy_Usym_mat (arma::mat & *usym*)

Convert symmetric matrix stored as upper triangular to full Matrix Assuming usym is the main diagonal and upper triangle of a symmertic matrix, fill in the lower triangle by copying the upper triangle. This operation modifies the matrix.

Definition at line 13 of file numerical.cpp.

Referenced by cholesky_convert_full_matrix().

7.1.3.25 void mappel::copy_Usym_mat_stack (arma::cube & *usym_stack*)

Definition at line 20 of file numerical.cpp.

7.1.3.26 template<class Model > void mappel::cr_lower_bound_stack (const Model & *model,* const typename Model::ParamVecT & *theta_stack,* typename Model::ParamVecT & *crlb_stack*)

Definition at line 304 of file stackcomp.h.

References mappel::methods::cr_lower_bound().

7.1.3.27 void mappel::enable_all_cpus ( )

Definition at line 10 of file util.cpp.

7.1.3.28 double mappel::estimate_background (const MatT & *im,* const MatT & *unit_model_im,* double *min_bg*)

Definition at line 263 of file stencil.cpp.

7.1.3.29 double mappel::estimate_background (const CubeT & *im,* const CubeT & *unit_model_im*)

Definition at line 282 of file stencil.cpp.

7.1.3.30 void mappel::estimate_gaussian_2Dmax (const MatT & *data,* const VecT & *Xstencil,* const VecT & *Ystencil,* int *max_pos[ ],* double & *min_val*)

Definition at line 141 of file stencil.cpp.

References gaussian_convolution().

7.1.3.31 void mappel::estimate_gaussian_3Dmax (const CubeT & *data,* const VecFieldT & *stencils,* int *max_pos[ ],* double & *min_val*)

Definition at line 205 of file stencil.cpp.

References gaussian_3D_convolution().

7.1.3.32 double mappel::estimate_intensity (const MatT & *im,* const MatT & *unit_model_im,* double *bg*)

Definition at line 277 of file stencil.cpp.

7.1.3.33 double mappel::estimate_intensity (const CubeT & *im,* const CubeT & *unit_model_im,* double *bg*)

Definition at line 292 of file stencil.cpp.

7.1.3.34 void mappel::fill_d_stencil (int *size,* double *stencil[ ],* double *theta_x*) [inline]

Definition at line 151 of file stencil.h.

Referenced by make_d_stencil().

7.1.3.35 void mappel::fill_DX_stencil (int *size,* double *stencil[ ],* const double *Gx[ ],* double *theta_sigma*) [inline]

Definition at line 176 of file stencil.h.

Referenced by make_DX_stencil().

7.1.3.36 void mappel::fill_DXS2_stencil (int *size,* double *stencil[ ],* const double *dx[ ],* const double *Gx[ ],* const double *DXS[ ],* double *theta_sigma*) [inline]

Definition at line 190 of file stencil.h.

Referenced by make_DXS2_stencil().

7.1.3.37 void mappel::fill_DXS_stencil (int *size,* double *stencil[ ],* const double *dx[ ],* const double *Gx[ ],* double *theta_sigma*) [inline]

Definition at line 183 of file stencil.h.

References square().

Referenced by make_DXS_stencil().

7.1.3.38 void mappel::fill_DXSX_stencil (int *size,* double *stencil[ ],* const double *dx[ ],* const double *Gx[ ],* const double *DX[ ],* double *theta_sigma*) [inline]

Definition at line 203 of file stencil.h.

Referenced by make_DXSX_stencil().

7.1.3.39 void mappel::fill_G_stencil (int *size,* double *stencil[ ],* const double *dx[ ],* double *theta_sigma*) [inline]

Definition at line 157 of file stencil.h.

References square().

Referenced by make_G_stencil().

7.1.3.40 void mappel::fill_gaussian_stencil (int *size,* double *stencil[ ],* double *sigma*)

Definition at line 40 of file stencil.cpp.

References gauss_norm().

Referenced by make_gaussian_stencil().

7.1.3.41 void mappel::fill_X_stencil (int *size,* double *stencil[ ],* const double *dx[ ],* double *theta_sigma*) [inline]

Definition at line 164 of file stencil.h.

Referenced by make_X_stencil().

7.1.3.42 template<class Model > void mappel::fisher_information_stack (const Model & *model,* const typename Model::ParamVecT & *theta_stack,* CubeT & *fisherI_stack*)

Definition at line 315 of file stackcomp.h.

References fisher_information().

7.1.3.43 double mappel::gamma_prior_grad (double *kappa,* double *mean,* double *v*) [inline]

Definition at line 320 of file stencil.h.

Referenced by mappel::PriorMAP1DObjective::prior_grad_update().

7.1.3.44 double mappel::gamma_prior_grad2 (double *kappa,* double *v*) [inline]

Definition at line 356 of file stencil.h.

Referenced by mappel::PriorMAP1DObjective::prior_grad2_update(), and mappel::PriorMAP1DObjective::prior_hess↩ _update().

7.1.3.45 double mappel::gauss_norm (double *sigma*) [inline]

Definition at line 92 of file stencil.h.

Referenced by fill_gaussian_stencil().

7.1.3.46 double mappel::gaussian_3D_convolution (int *x,* int *y,* int *z,* const **CubeT** & *data,* const **VecFieldT** & *stencils*)

Definition at line 184 of file stencil.cpp.

Referenced by estimate_gaussian_3Dmax(), and refine_gaussian_3Dmax().

7.1.3.47 double mappel::gaussian_convolution (int *x,* int *y,* const **MatT** & *data,* const **VecT** & *Xstencil,* const **VecT** & *Ystencil*)

Definition at line 127 of file stencil.cpp.

Referenced by estimate_gaussian_2Dmax(), and refine_gaussian_2Dmax().

7.1.3.48 template<class RngT > double mappel::generate_poisson (RngT & *rng,* double *mu*)

Definition at line 81 of file rng.h.

References generate_poisson_large(), and generate_poisson_small().

Referenced by mappel::methods::simulate_image(), simulate_image(), and mappel::methods::simulate_image_from↩ _model().

7.1.3.49 template<class RngT > IdxT mappel::generate_poisson_large (RngT & *rng,* double *mu*)

Definition at line 57 of file rng.h.

Referenced by generate_poisson().

7.1.3.50 template<class RngT > IdxT mappel::generate_poisson_small (RngT & *rng,* double *mu*)

Genrates a single poisson disributed int from distribution with mean mu.

Parameters

mu	- mean of poisson distribution
sfmt	- A pointer to the SFMT rng state.

Knuth method circa 1969. Trasformed to work ing log space. This is linear in mu. Works ok for small counts.

Definition at line 43 of file rng.h.

Referenced by generate_poisson().

7.1.3.51 const char * mappel::icontains (const char * *s*, const char * *pattern*)

Definition at line 39 of file util.cpp.

7.1.3.52 bool mappel::is_negative_definite (const arma::mat & *usym*)

Determine if C is negative definite (i.e., -C is positive definite)

Parameters

usym	A symmetric matrix in upper triangular format.

Returns

True if C is negative definite

Definition at line 52 of file numerical.cpp.

References is_positive_definite().

7.1.3.53 bool mappel::is_positive_definite (const arma::mat & *usym*)

Determine if C is positive definite

Parameters

usym	A symmetric matrix in upper triangular format.

Returns

True if C is positive definite

Definition at line 57 of file numerical.cpp.

References cholesky().

Referenced by is_negative_definite(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

7.1.3.54 bool mappel::is_symmetric (const arma::mat & *A*)

Check that full 2D matrix A is symmetric and can thus be treated as either upper or lower triangular symmetric representation. This will obviously not work with matricies that are already implicitly stored as symmetric triangular format since those matricies won't have the other triangle of elements filled in correctly.

Definition at line 63 of file numerical.cpp.

7.1.3.55 bool mappel::istarts_with (const char * *s*, const char * *pattern*)

Definition at line 21 of file util.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior(), mappel::Gauss2DModel::make_default_prior(), mappel::Gauss1DModel::make_default_prior(), mappel::Gauss2DsModel::make_default_prior(), mappel::methods::make_estimator(), and make_estimator().

7.1.3.56 bool mappel::istarts_with (const std::string & *str*, const char * *pattern*)

Definition at line 29 of file util.cpp.

7.1.3.57 const char* mappel::lambda_term_color (int *size*, int *Lidx*)

Definition at line 33 of file display.cpp.

References TERM_BLUE, TERM_CYAN, TERM_DIM_BLUE, TERM_DIM_CYAN, TERM_DIM_GREEN, TERM_DIM_MAGENTA, TERM_DIM_RED, TERM_DIM_WHITE, TERM_DIM_YELLOW, TERM_GREEN, TERM_MAGENTA, TERM_RED, TERM_WHITE, and TERM_YELLOW.

Referenced by print_image().

7.1.3.58 template<class Model > void mappel::log_likelihood_stack (const Model & *model*, const typename Model::ImageT & *image*, const typename Model::ParamVecT & *theta_stack*, VecT & *llh_stack*)

Parallel log_likelihood calculations for a single image.

Compute log-likelihood for multiple thetas using the same image

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image*	An image.
in	*theta_stack*	Sequence of thetas. Size: [model.num_params, nThetas]
out	*llh_stack*	Sequence of llh values computed.

Definition at line 128 of file stackcomp.h.

References mappel::methods::objective::openmp::llh_stack(), and log_likelihood().

7.1.3.59 template<class Model > void mappel::log_likelihood_stack (const Model & *model,* const typename Model::ImageStackT & *image_stack,* const typename Model::ParamVecT & *theta_stack,* VecT & *llh_stack*)

Parallel log_likelihood calculations for a stack of images.

Compute log-likelihood for multiple image, theta pairs.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image_stack*	Sequence of images.
in	*theta_stack*	Sequence of thetas. Size: [model.num_params, nThetas]
out	*llh_stack*	Sequence of llh values computed. Size: [n]

Definition at line 151 of file stackcomp.h.

References mappel::methods::objective::openmp::llh_stack(), and log_likelihood().

7.1.3.60 double mappel::log_prior_beta2_const (double *beta0,* double *beta1*) [inline]

Definition at line 248 of file stencil.h.

7.1.3.61 double mappel::log_prior_beta_const (double *beta*) [inline]

Definition at line 242 of file stencil.h.

7.1.3.62 double mappel::log_prior_gamma_const (double *kappa,* double *mean*) [inline]

Definition at line 255 of file stencil.h.

7.1.3.63 double mappel::log_prior_normal_const (double *sigma*) [inline]

Definition at line 267 of file stencil.h.

7.1.3.64 double mappel::log_prior_pareto_const (double *alpha,* double *min*) [inline]

Definition at line 261 of file stencil.h.

7.1.3.65 VecT mappel::make_d_stencil (int *size,* double *theta_x*) [inline]

Definition at line 97 of file stencil.h.

References fill_d_stencil().

Referenced by mappel::Gauss1DsModel::Stencil::Stencil(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss1DModel::Stencil::Stencil(), and mappel::Gauss2DsModel::Stencil::Stencil().

7.1.3.66 VecT mappel::make_DX_stencil (int *size,* const VecT & *Gx,* double *theta_sigma*) [inline]

Definition at line 118 of file stencil.h.

References fill_DX_stencil().

Referenced by mappel::Gauss1DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), and mappel::Gauss2DsModel::Stencil::compute_derivatives().

7.1.3.67 VecT mappel::make_DXS2_stencil (int *size,* const VecT & *dx,* const VecT & *Gx,* const VecT & *DXS,* double *theta_sigma*) [inline]

Definition at line 133 of file stencil.h.

References fill_DXS2_stencil().

Referenced by mappel::Gauss1DsModel::Stencil::compute_derivatives(), and mappel::Gauss2DsModel::Stencil::compute_derivatives().

7.1.3.68 VecT mappel::make_DXS_stencil (int *size,* const VecT & *dx,* const VecT & *Gx,* double *theta_sigma*) [inline]

Definition at line 125 of file stencil.h.

References fill_DXS_stencil().

Referenced by mappel::Gauss1DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), and mappel::Gauss2DsModel::Stencil::compute_derivatives().

7.1.3.69 VecT mappel::make_DXSX_stencil (int *size,* const VecT & *dx,* const VecT & *Gx,* const VecT & *DX,* double *theta_sigma*) [inline]

Definition at line 141 of file stencil.h.

References fill_DXSX_stencil().

Referenced by mappel::Gauss1DsModel::Stencil::compute_derivatives(), and mappel::Gauss2DsModel::Stencil::compute_derivatives().

7.1.3.70 VecT mappel::make_G_stencil (int *size,* const VecT & *dx,* double *theta_sigma*) [inline]

Definition at line 104 of file stencil.h.

References fill_G_stencil().

Referenced by mappel::Gauss1DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), and mappel::Gauss2DsModel::Stencil::compute_derivatives().

7.1.3.71 VecT mappel::make_gaussian_stencil (int *size,* double *sigma*) [inline]

Definition at line 216 of file stencil.h.

References fill_gaussian_stencil().

7.1.3.72 template<typename T , typename... Args> std::unique_ptr<T> mappel::make_unique (Args &&... *args*)

Definition at line 130 of file util.h.

References operator<<().

7.1.3.73 VecT mappel::make_X_stencil (int *size,* const VecT & *dx,* double *theta_sigma*) [inline]

Definition at line 111 of file stencil.h.

References fill_X_stencil().

Referenced by mappel::Gauss1DsModel::Stencil::Stencil(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss1DModel::Stencil::Stencil(), and mappel::Gauss2DsModel::Stencil::Stencil().

7.1.3.74 int mappel::maxidx (const VecT & *v*)

Definition at line 55 of file util.cpp.

7.1.3.75 template<class Model > void mappel::model_grad_stack (const Model & *model,* const typename Model::ImageStackT & *image_stack,* const typename Model::ParamVecT & *theta_stack,* typename Model::ParamVecT & *grad_stack*)

Parallel model gradient calculations for a stack of images.

Compute gradient of log-likelihood for multiple image, theta pairs.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model gradients.

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image_stack*	Sequence of images.
in	*theta_stack*	Sequence of thetas.
out	*grad_stack*	Sequence of grad vectors values computed. Size: [model.num_params, n]

Definition at line 188 of file stackcomp.h.

References mappel::methods::objective::grad(), and model_grad().

7.1.3.76 template<class Model > void mappel::model_hessian_stack (const Model & *model*, const typename Model::ImageStackT & *image_stack*, const typename Model::ParamVecT & *theta_stack*, CubeT & *hessian_stack*)

Parallel model Hessian calculations for a stack of images.

Compute Hessian of log-likelihood for multiple image, theta pairs.

Use: model.make_param_mat_stack() to make a parameter matrix stack of appropriate dimensions for the model Hessian.

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image_stack*	Sequence of images.
in	*theta_stack*	Sequence of thetas. Size: [model.num_params, nThetas]
out	*hess_stack*	Sequence of Hessian matrices computed. Size: [model.num_params, model.num_params, n]

Definition at line 231 of file stackcomp.h.

References mappel::methods::objective::grad(), and model_hessian().

7.1.3.77 template<class Model > void mappel::model_image_stack (const Model & *model*, const typename Model::ParamVecT & *theta_stack*, typename Model::ImageStackT & *image_stack*)

Parallel computation of the model image.

The model image is the expected photon count at each pixel under parameter theta.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model Use: model.↩ make_image_stack() to make an image stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*theta_stack*	Sequence of thetas for which to generate images. Size: [model.num_params, nThetas]
out	*image_stack*	Sequence of model images generated.

Definition at line 62 of file stackcomp.h.

References model_image().

7.1.3.78 template<class Model > void mappel::model_positive_hessian_stack (const Model & *model*, const typename Model::ImageStackT & *image_stack*, const typename Model::ParamVecT & *theta_stack*, CubeT & *hessian_stack*)

Parallel model positive-definite Hessian approximation calculations for a stack of images.

Compute Hessian a positive-definite Hessian using a modified cholesky decompositions. Computes for multiple image, theta pairs.

Use: model.make_param_mat_stack() to make a parameter matrix stack of appropriate dimensions for the model Hessian.

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image_stack*	Sequence of images.
in	*theta_stack*	Sequence of thetas. Size: [model.num_params, nThetas]
out	*hess_stack*	Sequence of approximate Hessian matrices computed. Size: [model.num_params, model.num_params, n]

Definition at line 276 of file stackcomp.h.

7.1.3.79 bool mappel::modified_cholesky (arma::mat & *usym*)

Parameters

usym	An upper triangular symmetric matrix stored in a full matrix format. This matrix will be overwritten with the upper triangle and diagonal elements of the modified cholesky decomposition.

Returns

true if usym was positive semi-definite (no cholesky modification required). If false we made a modification

Definition at line 127 of file numerical.cpp.

Referenced by cholesky_make_negative_definite(), and cholesky_make_positive_definite().

7.1.3.80 double mappel::normal_prior_grad (double *mu,* double *sigma*)

7.1.3.81 double mappel::normal_prior_grad (double *sigma*)

7.1.3.82 double mappel::normal_prior_grad (double *mu,* double *sigma,* double *v*) [inline]

Definition at line 332 of file stencil.h.

7.1.3.83 double mappel::normal_prior_grad2 (double *sigma*) [inline]

Definition at line 368 of file stencil.h.

7.1.3.84 double mappel::normal_quantile_onesided (double *confidence*)

Definition at line 29 of file stencil.cpp.

7.1.3.85 double mappel::normal_quantile_twosided (double *confidence*)

Definition at line 18 of file stencil.cpp.

Referenced by mappel::methods::error_bounds_expected(), mappel::methods::openmp::error_bounds_expected_stack(), and mappel::methods::error_bounds_observed().

7.1.3.86 std::ostream & mappel::operator<< (std::ostream & *out,* const StatsT & *stats*)

Definition at line 68 of file util.cpp.

7.1.3.87 template<class Model , typename = EnableIfSubclassT<Model,PointEmitterModel>> std::ostream & mappel::operator<< (std::ostream & *out,* const Model & *model*)

Definition at line 276 of file PointEmitterModel.h.

7.1.3.88 std::ostream& mappel::operator<< (std::ostream & *out,* const Gauss1DModel::Stencil & *s*)

Definition at line 164 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::Stencil::derivatives_computed, mappel::Gauss1DModel::Stencil::dx, mappel::Gauss1DModel::Stencil::DX, mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::Gx, print_vec_row(), TERM_BLUE, TERM_CYAN, TERM_WHITE, mappel::Gauss1DModel::Stencil::theta, and mappel::Gauss1DModel::Stencil::X.

Referenced by make_unique().

7.1.3.89 template<class Model > std::ostream& mappel::operator<< (std::ostream & *out,* Estimator< Model > & *estimator*)

Definition at line 175 of file estimator_impl.h.

References mappel::Estimator< Model >::get_stats().

7.1.3.90 std::ostream& mappel::operator<< (std::ostream & *out,* const Gauss1DsModel::Stencil & *s*)

Definition at line 182 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::Stencil::derivatives_computed, mappel::Gauss1DsModel::Stencil::dx, mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1DsModel::Stencil::DXS2, mappel::Gauss1DsModel::Stencil::DXSX, mappel::Gauss1DsModel::Stencil::Gx, print_vec_row(), TERM_BLUE, TERM_CYAN, TERM_WHITE, mappel::Gauss1DsModel::Stencil::theta, and mappel::Gauss1DsModel::Stencil::X.

7.1.3.91 std::ostream& mappel::operator<< (std::ostream & *out,* const Gauss2DModel::Stencil & *s*)

Definition at line 249 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::Stencil::derivatives_computed, mappel::Gauss2DModel::Stencil::dx, mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::Stencil::dy, mappel::Gauss2DModel::Stencil::DY, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::Stencil::Gx, mappel::Gauss2DModel::Stencil::Gy, print_vec_row(), TERM_BLUE, TERM_CYAN, TERM_WHITE, mappel::Gauss2DModel::Stencil::theta, mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

7.1.3.92 std::ostream& mappel::operator<< (std::ostream & *out,* const Gauss2DsModel::Stencil & *s*)

Definition at line 318 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::Stencil::derivatives_computed, mappel::Gauss2DsModel::Stencil::dx, mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2DsModel::Stencil::DXS2, mappel::Gauss2DsModel::Stencil::DXSX, mappel::Gauss2DsModel::Stencil::dy, mappel::Gauss2DsModel::Stencil::DY, mappel::Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::DYSY, mappel::Gauss2DsModel::Stencil::Gx, mappel::Gauss2DsModel::Stencil::Gy, print_vec_row(), TERM_BLUE, TERM_CYAN, TERM_WHITE, mappel::Gauss2DsModel::Stencil::theta, mappel::Gauss2DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

7.1.3.93 double mappel::pareto_prior_grad (double *alpha,* double *v*) [inline]

Definition at line 326 of file stencil.h.

7.1.3.94 double mappel::pareto_prior_grad2 (double *alpha,* double *v*) [inline]

Definition at line 362 of file stencil.h.

7.1.3.95 double mappel::poisson_log_likelihood (double *model_val,* double *data_val*) [inline]

Definition at line 224 of file stencil.h.

Referenced by mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), and log_likelihood().

7.1.3.96 ostream& mappel::print_centered_title (ostream & *out,* char *fill,* int *width,* const char * *title* = nullptr)

Definition at line 83 of file display.cpp.

Referenced by print_image(), and print_labeled_image().

7.1.3.97 template<class ImageT > std::ostream& mappel::print_image (std::ostream & *out,* const ImageT & *im*)

7.1.3.98 template<> std::ostream& mappel::print_image (std::ostream & *out,* const arma::vec & *im*)

Definition at line 139 of file display.cpp.

References print_labeled_image().

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate().

7.1.3.99 template<> std::ostream& mappel::print_image (std::ostream & *out,* const arma::mat & *im*)

Definition at line 147 of file display.cpp.

References print_labeled_image().

7.1.3.100 template<> std::ostream& mappel::print_image (std::ostream & *out,* const arma::cube & *im*)

Definition at line 154 of file display.cpp.

References lambda_term_color(), print_centered_title(), and print_labeled_image().

7.1.3.101 ostream& mappel::print_labeled_image (ostream & *out,* const arma::mat & *im,* const char * *title,* const char * *color*)

Definition at line 95 of file display.cpp.

References print_centered_title().

Referenced by print_image().

7.1.3.102 template<class Vec > std::ostream& mappel::print_vec_row (std::ostream & *out,* const Vec & *vec,* const char * *header,* int *header_width,* const char * *color* = nullptr)

Definition at line 42 of file display.h.

Referenced by operator<<().

7.1.3.103 void mappel::refine_gaussian_2Dmax (const MatT & *data,* const VecT & *Xstencil,* const VecT & *Ystencil,* int *max_pos[]*)

Definition at line 157 of file stencil.cpp.

References gaussian_convolution().

7.1.3.104 void mappel::refine_gaussian_3Dmax (const CubeT & *data,* const VecFieldT & *stencils,* int *max_pos[ ]*)

Definition at line 225 of file stencil.cpp.

References gaussian_3D_convolution().

7.1.3.105 double mappel::relative_poisson_log_likelihood (double *model_val,* double *data_val*) [inline]

Definition at line 233 of file stencil.h.

Referenced by relative_log_likelihood(), mappel::methods::likelihood::rllh(), and mappel::methods::likelihood::debug↩ ::rllh_components().

7.1.3.106 double mappel::restrict_value_range (double *val,* double *minval,* double *maxval*) [inline]

Definition at line 123 of file util.h.

7.1.3.107 double mappel::rllh_beta2_prior (double *beta0,* double *beta1,* double *v,* double *max* = 1., double *min* = 0.) [inline]

Definition at line 280 of file stencil.h.

7.1.3.108 double mappel::rllh_beta_prior (double *beta,* double *v,* double *max* = 1., double *min* = 0.) [inline]

Definition at line 273 of file stencil.h.

Referenced by mappel::PriorMAP1DObjective::prior_relative_log_likelihood().

7.1.3.109 double mappel::rllh_gamma_prior (double *kappa,* double *mean,* double *v*) [inline]

Definition at line 287 of file stencil.h.

Referenced by mappel::PriorMAP1DObjective::prior_relative_log_likelihood().

7.1.3.110 double mappel::rllh_normal_prior (double *mu,* double *sigma*)

7.1.3.111 double mappel::rllh_normal_prior (double *mu,* double *sigma,* double *v*) [inline]

Definition at line 299 of file stencil.h.

7.1.3.112 double mappel::rllh_pareto_prior (double *alpha,* double *v*) [inline]

Definition at line 293 of file stencil.h.

7.1.3.113 template<class Model > void mappel::sample_prior_stack (Model & *model,* typename Model::ParamVecT & *theta_stack*)

Parallel sampling of the model prior.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model,A*	PointEmitterModel object.
out	*theta_stack,A*	sequence of sampled thetas. Size: [model.num_params, nSamples]

Definition at line 36 of file stackcomp.h.

References rng_manager.

7.1.3.114 template<typename T > int mappel::sgn (T *val*)

sign (signum) function: -1/0/1

Definition at line 116 of file util.h.

Referenced by mappel::TrustRegionMaximizer< Model >::compute_bound_scaling_vec().

7.1.3.115 template<class Model > void mappel::simulate_image_stack (const Model & *model,* const typename Model::ParamVecT & *theta_stack,* typename Model::ImageStackT & *image_stack*)

Parallel simulation of images from one or more theta.

This accepts either a single theta and a stack of images, or a stack of thetas and a stack of images.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model Use: model.↩ make_image_stack() to make an image stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*theta_stack*	Single theta or a sequence of thetas. Size: [model.num_params, nThetas]
out	*image_stack*	Sequence of model images generated.

Definition at line 87 of file stackcomp.h.

References model_image(), rng_manager, mappel::methods::simulate_image(), and mappel::methods::simulate_↩ image_from_model().

7.1.3.116 template<typename T > T mappel::square (T *x*)

Definition at line 121 of file util.h.

Referenced by fill_DXS_stencil(), and fill_G_stencil().

7.1.4 Variable Documentation

7.1.4.1 ParallelRngManagerT mappel::rng_manager

Definition at line 6 of file rng.cpp.

Referenced by mappel::PointEmitterModel::get_rng_generator(), mappel::PointEmitterModel::get_rng_manager(), mappel::PointEmitterModel::get_stats(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMC↩ Adaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMC↩ Adaptor1D::sample_mcmc_candidate(), mappel::PointEmitterModel::sample_prior(), sample_prior_stack(), mappel::↩ PointEmitterModel::set_rng_seed(), and simulate_image_stack().

7.1.4.2 const char * mappel::TERM_BLACK ="1;30"

Definition at line 13 of file display.cpp.

7.1.4.3 const char * mappel::TERM_BLUE ="1;34"

Definition at line 17 of file display.cpp.

Referenced by lambda_term_color(), and operator<<().

7.1.4.4 const char * mappel::TERM_CYAN ="1;36"

Definition at line 19 of file display.cpp.

Referenced by lambda_term_color(), and operator<<().

7.1.4.5 const char * mappel::TERM_DIM_BLACK ="0;30"

Definition at line 21 of file display.cpp.

7.1.4.6 const char * mappel::TERM_DIM_BLUE ="0;34"

Definition at line 25 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.7 const char * mappel::TERM_DIM_CYAN ="0;36"

Definition at line 27 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.8 const char * mappel::TERM_DIM_GREEN ="0;32"

Definition at line 23 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.9 const char * mappel::TERM_DIM_MAGENTA ="0;35"

Definition at line 26 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.10 const char * mappel::TERM_DIM_RED ="0;31"

Definition at line 22 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.11 const char * mappel::TERM_DIM_WHITE ="0;37"

Definition at line 28 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.12 const char * mappel::TERM_DIM_YELLOW ="0;33"

Definition at line 24 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.13 const char * mappel::TERM_GREEN ="1;32"

Definition at line 15 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.14 const char * mappel::TERM_MAGENTA ="1;35"

Definition at line 18 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.15 const char * mappel::TERM_RED ="1;31"

Definition at line 14 of file display.cpp.

Referenced by lambda_term_color().

7.1.4.16 const char * mappel::TERM_WHITE ="1;37"

Definition at line 20 of file display.cpp.

Referenced by lambda_term_color(), and operator<<().

7.1.4.17 const char * mappel::TERM_YELLOW ="1;33"

Definition at line 16 of file display.cpp.

Referenced by lambda_term_color().

7.2 mappel::mcmc Namespace Reference

Functions

- IdxT num_oversample (IdxT Nsample, IdxT Nburnin, IdxT thin)
- MatT thin_sample (MatT &sample, IdxT Nburnin, IdxT thin)
- void thin_sample (const MatT &sample, const VecT &sample_rllh, IdxT Nburnin, IdxT thin, MatT &subsample, VecT &subsample_rllh)
- void estimate_sample_posterior (const MatT &sample, VecT &theta_posterior_mean, MatT &theta_posterior_↩ cov)
- template<class Model >
  void sample_posterior (Model &model, const ModelDataT< Model > &im, const StencilT< Model > &theta_init, MatT &sample, VecT &sample_rllh)
- template<class Model >
  void sample_posterior_debug (Model &model, const ModelDataT< Model > &im, const StencilT< Model > &theta_init, MatT &sample, VecT &sample_rllh, MatT &candidate, VecT &candidate_rllh)

7.2.1 Function Documentation

7.2.1.1 void mappel::mcmc::estimate_sample_posterior (const MatT & *sample,* VecT & *theta_posterior_mean,* MatT & *theta_posterior_cov*) [inline]

Definition at line 25 of file mcmc.h.

Referenced by mappel::methods::estimate_mcmc_posterior().

7.2.1.2 IdxT mappel::mcmc::num_oversample (IdxT *Nsample,* IdxT *Nburnin,* IdxT *thin*)

Definition at line 7 of file mcmc.cpp.

Referenced by mappel::methods::estimate_mcmc_sample().

7.2.1.3 template<class Model > void mappel::mcmc::sample_posterior (Model & *model,* const ModelDataT< Model > & *im,* const StencilT< Model > & *theta_init,* MatT & *sample,* VecT & *sample_rllh*)

Definition at line 32 of file mcmc.h.

References mappel::methods::objective::rllh().

Referenced by mappel::methods::estimate_mcmc_sample().

7.2.1.4 template<class Model > void mappel::mcmc::sample_posterior_debug (Model & *model,* const ModelDataT< Model > & *im,* const StencilT< Model > & *theta_init,* MatT & *sample,* VecT & *sample_rllh,* MatT & *candidate,* VecT & *candidate_rllh*)

Definition at line 64 of file mcmc.h.

References mappel::methods::objective::rllh().

Referenced by mappel::methods::debug::estimate_mcmc_sample_debug().

7.2.1.5 MatT mappel::mcmc::thin_sample (MatT & *sample,* IdxT *Nburnin,* IdxT *thin*)

Definition at line 13 of file mcmc.cpp.

Referenced by mappel::methods::estimate_mcmc_sample().

7.2.1.6 void mappel::mcmc::thin_sample (const MatT & *sample,* const VecT & *sample_rllh,* IdxT *Nburnin,* IdxT *thin,* MatT & *subsample,* VecT & *subsample_rllh*)

Definition at line 24 of file mcmc.cpp.

7.3 mappel::methods Namespace Reference

Templated functions for operating on a PointEmitterModel.

Namespaces

- debug
- likelihood
- objective
- openmp

Functions

- template<class Model >
  ReturnIfSubclassT< ImageT< Model >, Model, ImageFormat1DBase > model_image (const Model &model, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< ImageT< Model >, Model, ImageFormat2DBase > model_image (const Model &model, const typename Model::Stencil &s)
- template<class Model >
  ImageT< Model > model_image (const Model &model, const ParamT< Model > &theta)
- template<class Model , class rng_t >
  ModelDataT< Model > simulate_image (Model &model, const ParamT< Model > &theta)
- template<class Model , class rng_t >
  ModelDataT< Model > simulate_image (Model &model, const ParamT< Model > &theta, rng_t &rng)
- template<class Model >
  ModelDataT< Model > simulate_image (Model &model, const StencilT< Model > &s)
- template<class Model >
  ModelDataT< Model > simulate_image_from_model (Model &model, const ImageT< Model > &model_im)
- template<class Model >
  void aposteriori_objective (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void aposteriori_objective (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void prior_objective (const Model &model, const ParamT< Model > &theta, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void likelihood_objective (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void likelihood_objective (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  ParamT< Model > cr_lower_bound (const Model &model, const typename Model::Stencil &s)

  Calculate the Cramer-Rao lower bound at the given parameters.
- template<class Model >
  ParamT< Model > cr_lower_bound (const Model &model, const ParamT< Model > &theta)
- template<class Model >
  MatT expected_information (const Model &model, const ParamT< Model > &theta)
- template<class Model >
  MatT observed_information (const Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_mode)
- template<class Model >
  MatT observed_information (const Model &model, const ModelDataT< Model > &data, const StencilT< Model > &theta_mode)
- template<class Model >
  StencilT< Model > estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method)
- template<class Model >
  StencilT< Model > estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, double &rllh)

- template<class Model >
  void estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI)
- template<class Model >
  void estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI, StatsT &stats)
- template<class Model >
  void estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI)
- template<class Model >
  void estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI, StatsT &stats)
- template<class Model >
  MatT estimate_mcmc_sample (Model &model, const ModelDataT< Model > &data, IdxT Nsample=1000, IdxT Nburnin=100, IdxT thin=0)
- template<class Model >
  MatT estimate_mcmc_sample (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample=1000, IdxT Nburnin=100, IdxT thin=0)
- template<class Model >
  void estimate_mcmc_sample (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample, IdxT Nburnin, IdxT thin, MatT &sample, VecT &sample_rllh)
- template<class Model >
  void estimate_mcmc_posterior (Model &model, const ModelDataT< Model > &data, IdxT Nsample, IdxT Nburnin, IdxT thin, ParamT< Model > &posterior_mean, MatT &posterior_cov)
- template<class Model >
  void estimate_mcmc_posterior (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample, IdxT Nburnin, IdxT thin, ParamT< Model > &posterior_mean, MatT &posterior_cov)
- template<class Model >
  void error_bounds_expected (const Model &model, const ParamT< Model > &theta_est, double confidence, ParamT< Model > &theta_lb, ParamT< Model > &theta_ub)
- template<class Model >
  void error_bounds_observed (const Model &model, const ParamT< Model > &theta_est, MatT &obsI, double confidence, ParamT< Model > &theta_lb, ParamT< Model > &theta_ub)
- template<class Model >
  void error_bounds_posterior_credible (const Model &model, const MatT &sample, double confidence, ParamT< Model > &theta_mean, ParamT< Model > &theta_lb, ParamT< Model > &theta_ub)
- template<class Model >
  Model::ImageT model_image (const Model &model, const ParamT< Model > &theta)
- template<class Model >
  ModelDataT< Model > simulate_image (Model &model, const ParamT< Model > &theta)
- template<class Model , class RngT >
  ModelDataT< Model > simulate_image (Model &model, const ParamT< Model > &theta, RngT &rng)
- template<class Model , class rng_t >
  ReturnIfSubclassT< ModelDataT< Model >, Model, PoissonNoise1DObjective > simulate_image (const Model &model, const StencilT< Model > &s, rng_t &rng)

  Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise1DObjective.
- template<class Model , class rng_t >
  ReturnIfSubclassT< ModelDataT< Model >, Model, PoissonNoise1DObjective > simulate_image_from_model (const Model &model, const ImageT< Model > &model_im, rng_t &rng)

  Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise1DObjective.

- template<class Model >
  ReturnIfSubclassT< MatT, Model, PoissonNoise1DObjective > expected_information (const Model &model, const StencilT< Model > &s)

  Compute the expected information (Fisher information at theta). Note: Expected information is an average quantity and is independent of the data. Enabled for PoissonNoise1DObjective.
- template<class Model >
  ReturnIfSubclassT< std::unique_ptr< Estimator< Model > >, Model, PoissonNoise1DObjective > make_estimator (Model &model, std::string ename)
- template<class Model , class rng_t >
  ReturnIfSubclassT< ImageT< Model >, Model, PoissonNoise2DObjective > simulate_image (const Model &model, const StencilT< Model > &s, rng_t &rng)

  Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise2DObjective.
- template<class Model , class rng_t >
  ReturnIfSubclassT< ImageT< Model >, Model, PoissonNoise2DObjective > simulate_image_from_model (const Model &model, const ImageT< Model > &model_im, rng_t &rng)

  Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise2DObjective.
- template<class Model >
  ReturnIfSubclassT< MatT, Model, PoissonNoise2DObjective > expected_information (const Model &model, const StencilT< Model > &s)

  Compute the expected information (Fisher information at theta). Note: Expected information is an average quantity and is independent of the data. Enabled for PoissonNoise2DObjective.
- template<class Model >
  ReturnIfSubclassT< std::unique_ptr< Estimator< Model > >, Model, PoissonNoise2DObjective > make_estimator (Model &model, std::string ename)

7.3.1 Detailed Description

Templated functions for operating on a PointEmitterModel.

Most methods are overloaded to take a ParamT or a StencilT. The precomputed stencil for a theta value contains the common computational values needed by all methods that compute the likelihood function or its derivatives. Note that methods in model::prior:: namespace do not take a stencil (or data) a they are independent of the data and the likelihood function.

Methods with xxx_comonents return a sequence of values representing the results from each pixel in turn. The sum of these components is the overall model value. (e.g. sum(llh_components(...))==llh(...)). These methods are usefully for detailed inspection of the contributions of each pixel or prior component to the overall result.External template based methods for PointEmitterModel's. These are general or convenience functions that are included in this file. Those methods specific to other sub-types of Models should be included within that sub-type's .h file, using the enable_if mechanism to restrict their instantiation to the correct sub-types.

7.3.2 Function Documentation

7.3.2.1 template<class Model > void mappel::methods::aposteriori_objective (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s,* double & *rllh,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 219 of file model_methods_impl.h.

References mappel::methods::likelihood::hessian(), and mappel::methods::likelihood::rllh().

Referenced by aposteriori_objective().

7.3.2.2 template<class Model > void mappel::methods::aposteriori_objective (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta,* double & *rllh,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 257 of file model_methods_impl.h.

References aposteriori_objective(), mappel::methods::objective::grad(), and mappel::methods::objective::rllh().

7.3.2.3 template<class Model > ParamT< Model > mappel::methods::cr_lower_bound (const Model & *model,* const typename Model::Stencil & *s*)

Calculate the Cramer-Rao lower bound at the given parameters.

Parameters

in	*theta*	The parameters to evaluate the CRLB at
out	*crlb*	The calculated parameters

Definition at line 284 of file model_methods_impl.h.

References expected_information().

Referenced by cr_lower_bound(), mappel::cr_lower_bound_stack(), and error_bounds_expected().

7.3.2.4 template<class Model > ParamT< Model > mappel::methods::cr_lower_bound (const Model & *model,* const ParamT< Model > & *theta*)

Definition at line 296 of file model_methods_impl.h.

References cr_lower_bound().

7.3.2.5 template<class Model > void mappel::methods::error_bounds_expected (const Model & *model,* const ParamT< Model > & *theta_est,* double *confidence,* ParamT< Model > & *theta_lb,* ParamT< Model > & *theta_ub*)

Definition at line 440 of file model_methods_impl.h.

References cr_lower_bound(), and mappel::normal_quantile_twosided().

7.3.2.6 template<class Model > void mappel::methods::error_bounds_observed (const Model & *model,* const ParamT< Model > & *theta_est,* MatT & *obsI,* double *confidence,* ParamT< Model > & *theta_lb,* ParamT< Model > & *theta_ub*)

Definition at line 451 of file model_methods_impl.h.

References mappel::normal_quantile_twosided().

7.3.2.7 template<class Model > void mappel::methods::error_bounds_posterior_credible (const Model & *model,* const MatT & *sample,* double *confidence,* ParamT< Model > & *theta_mean,* ParamT< Model > & *theta_lb,* ParamT< Model > & *theta_ub*)

Definition at line 467 of file model_methods_impl.h.

7.3.2.8 template<class Model > StencilT< Model > mappel::methods::estimate_max (Model & *model,* const ModelDataT< Model > & *data,* const std::string & *method*)

Definition at line 323 of file model_methods_impl.h.

References make_estimator().

Referenced by mappel::Estimator< Model >::estimate_max(), mappel::Gauss2DModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

7.3.2.9 template<class Model > StencilT< Model > mappel::methods::estimate_max (Model & *model,* const ModelDataT< Model > & *data,* const std::string & *method,* const ParamT< Model > & *theta_init,* double & *rllh*)

Definition at line 330 of file model_methods_impl.h.

References make_estimator().

7.3.2.10 template<class Model > void mappel::methods::estimate_max (Model & *model,* const ModelDataT< Model > & *data,* const std::string & *method,* ParamT< Model > & *theta_max,* double & *theta_max_llh,* MatT & *obsI*)

Definition at line 338 of file model_methods_impl.h.

References make_estimator().

7.3.2.11 template<class Model > void mappel::methods::estimate_max (Model & *model,* const ModelDataT< Model > & *data,* const std::string & *method,* ParamT< Model > & *theta_max,* double & *theta_max_llh,* MatT & *obsI,* StatsT & *stats*)

Definition at line 346 of file model_methods_impl.h.

References make_estimator().

7.3.2.12 template<class Model > void mappel::methods::estimate_max (Model & *model,* const ModelDataT< Model > & *data,* const std::string & *method,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_max,* double & *theta_max_llh,* MatT & *obsI*)

Definition at line 355 of file model_methods_impl.h.

References make_estimator().

7.3.2.13 template<class Model > void mappel::methods::estimate_max (Model & *model,* const ModelDataT< Model > & *data,* const std::string & *method,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_max,* double & *theta_max_llh,* MatT & *obsI,* StatsT & *stats*)

Definition at line 363 of file model_methods_impl.h.

References make_estimator().

7.3.2.14 template<class Model > void mappel::methods::estimate_mcmc_posterior (Model & *model*, const ModelDataT< Model > & *data*, IdxT *Nsample*, IdxT *Nburnin*, IdxT *thin*, ParamT< Model > & *posterior_mean*, MatT & *posterior_cov*)

Definition at line 423 of file model_methods_impl.h.

Referenced by estimate_mcmc_posterior().

7.3.2.15 template<class Model > void mappel::methods::estimate_mcmc_posterior (Model & *model*, const ModelDataT< Model > & *data*, const ParamT< Model > & *theta_init*, IdxT *Nsample*, IdxT *Nburnin*, IdxT *thin*, ParamT< Model > & *posterior_mean*, MatT & *posterior_cov*)

Definition at line 431 of file model_methods_impl.h.

References estimate_mcmc_posterior(), and mappel::mcmc::estimate_sample_posterior().

7.3.2.16 template<class Model > MatT mappel::methods::estimate_mcmc_sample (Model & *model*, const ModelDataT< Model > & *data*, IdxT *Nsample* = 1000, IdxT *Nburnin* = 100, IdxT *thin* = 0)

Definition at line 386 of file model_methods_impl.h.

7.3.2.17 template<class Model > MatT mappel::methods::estimate_mcmc_sample (Model & *model*, const ModelDataT< Model > & *data*, const ParamT< Model > & *theta_init*, IdxT *Nsample* = 1000, IdxT *Nburnin* = 100, IdxT *thin* = 0)

Definition at line 393 of file model_methods_impl.h.

References mappel::mcmc::num_oversample(), mappel::mcmc::sample_posterior(), and mappel::mcmc::thin_sample().

7.3.2.18 template<class Model > void mappel::methods::estimate_mcmc_sample (Model & *model*, const ModelDataT< Model > & *data*, const ParamT< Model > & *theta_init*, IdxT *Nsample*, IdxT *Nburnin*, IdxT *thin*, MatT & *sample*, VecT & *sample_rllh*)

Definition at line 406 of file model_methods_impl.h.

References mappel::mcmc::num_oversample(), mappel::mcmc::sample_posterior(), and mappel::mcmc::thin_sample().

7.3.2.19 template<class Model > ReturnIfSubclassT<MatT, Model, PoissonNoise1DObjective> mappel::methods::expected_information (const Model & *model*, const StencilT< Model > & *s*)

Compute the expected information (Fisher information at theta). Note: Expected information is an average quantity and is independent of the data. Enabled for PoissonNoise1DObjective.

Parameters

model	PointEmitterModel
s	Stencil at desired theta

Returns

The fisher information matrix as an symmetric matrix in upper-triangular format

Definition at line 77 of file PoissonNoise1DObjective.h.

7.3.2.20 template<class Model > ReturnIfSubclassT<MatT, Model, PoissonNoise2DObjective> mappel::methods::expected_information (const Model & *model,* const StencilT< Model > & *s*)

Compute the expected information (Fisher information at theta). Note: Expected information is an average quantity and is independent of the data. Enabled for PoissonNoise2DObjective.

Parameters

model	PoImageCoordTEmitterModel
s	Stencil at desired theta

Returns

The fisher information matrix as an symmetric matrix in upper-triangular format

Definition at line 83 of file PoissonNoise2DObjective.h.

References mappel::ImageFormat2DBase::size.

7.3.2.21 template<class Model > MatT mappel::methods::expected_information (const Model & *model,* const ParamT< Model > & *theta*)

Definition at line 302 of file model_methods_impl.h.

Referenced by cr_lower_bound().

7.3.2.22 template<class Model > void mappel::methods::likelihood_objective (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s,* double & *rllh,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 248 of file model_methods_impl.h.

References mappel::methods::likelihood::hessian(), and mappel::methods::likelihood::rllh().

Referenced by likelihood_objective().

7.3.2.23 template<class Model > void mappel::methods::likelihood_objective (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta,* double & *rllh,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 271 of file model_methods_impl.h.

References mappel::methods::objective::grad(), likelihood_objective(), and mappel::methods::objective::rllh().

7.3.2.24 template<class Model > ReturnIfSubclassT<std::unique_ptr<Estimator<Model> >, Model, PoissonNoise1DObjective> mappel::methods::make_estimator (Model & *model,* std::string *ename*)

Definition at line 95 of file PoissonNoise1DObjective.h.

References mappel::istarts_with().

Referenced by estimate_max(), mappel::methods::debug::estimate_max_debug(), mappel::methods::openmp::estimate_max_stack(), and mappel::methods::openmp::estimate_profile_likelihood().

7.3.2.25 template<class Model > ReturnIfSubclassT<std::unique_ptr<Estimator<Model> >, Model, PoissonNoise2DObjective> mappel::methods::make_estimator (Model & *model,* std::string *ename*)

Definition at line 100 of file PoissonNoise2DObjective.h.

References mappel::istarts_with().

7.3.2.26 template<class Model > Model::ImageT mappel::methods::model_image (const Model & *model,* const ParamT< Model > & *theta*)

Expected number of photons at each pixel in image given the emitter model

Definition at line 17 of file model_methods_impl.h.

References model_image().

7.3.2.27 template<class Model > ImageT<Model> mappel::methods::model_image (const Model & *model,* const ParamT< Model > & *theta*)

Expected number of photons at each pixel in image given the emitter model

Definition at line 17 of file model_methods_impl.h.

References model_image().

7.3.2.28 template<class Model > ReturnIfSubclassT<ImageT<Model>, Model, ImageFormat2DBase> mappel::methods::model_image (const Model & *model,* const typename Model::Stencil & *s*)

Definition at line 122 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

7.3.2.29 template<class Model > ReturnIfSubclassT<ImageT<Model>, Model, ImageFormat1DBase> mappel::methods::model_image (const Model & *model,* const StencilT< Model > & *s*)

Definition at line 125 of file ImageFormat1DBase.h.

Referenced by model_image(), and mappel::methods::openmp::simulate_image_stack().

7.3.2.30 template<class Model > MatT mappel::methods::observed_information (const Model & *model,* const ModelDataT< Model > & *data,* const ParamT< Model > & *theta_mode*)

Definition at line 316 of file model_methods_impl.h.

Referenced by mappel::Estimator< Model >::compute_estimate(), and mappel::Estimator< Model >::estimate_max↩_debug().

7.3.2.31 template<class Model > MatT mappel::methods::observed_information (const Model & *model,* const ModelDataT< Model > & *data,* const StencilT< Model > & *theta_mode*)

Definition at line 308 of file model_methods_impl.h.

References mappel::methods::objective::hessian().

7.3.2.32 template<class Model > void mappel::methods::prior_objective (const Model & *model,* const ParamT< Model > & *theta,* double & *rllh,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 230 of file model_methods_impl.h.

7.3.2.33 template<class Model > ModelDataT<Model> mappel::methods::simulate_image (Model & *model,* const ParamT< Model > & *theta*)

Definition at line 23 of file model_methods_impl.h.

References simulate_image().

Referenced by simulate_image(), mappel::simulate_image_stack(), and mappel::methods::openmp::simulate_image↩_stack().

7.3.2.34 template<class Model , class RngT > ModelDataT<Model> mappel::methods::simulate_image (Model & *model,* const ParamT< Model > & *theta,* RngT & *rng*)

Definition at line 30 of file model_methods_impl.h.

References simulate_image().

7.3.2.35 template<class Model , class rng_t > ModelDataT<Model> mappel::methods::simulate_image (Model & *model,* const ParamT< Model > & *theta*)

Definition at line 23 of file model_methods_impl.h.

References simulate_image().

Referenced by simulate_image(), mappel::simulate_image_stack(), and mappel::methods::openmp::simulate_image↩_stack().

7.3.2.36 template<class Model , class rng_t > ReturnIfSubclassT<ModelDataT<Model>, Model, PoissonNoise1DObjective> mappel::methods::simulate_image (const Model & *model,* const StencilT< Model > & *s,* rng_t & *rng*)

Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise1DObjective.

Parameters

in	*model*	Model object
in	*s*	The stencil computed at theta.
in,out	*rng*	A random number generator

Returns

A simulated image at theta under the noise model.

Definition at line 45 of file PoissonNoise1DObjective.h.

References mappel::generate_poisson().

7.3.2.37 template<class Model , class rng_t > ReturnIfSubclassT<ImageT<Model>, Model, PoissonNoise2D↩ Objective> mappel::methods::simulate_image (const Model & *model,* const StencilT< Model > & *s,* rng_t & *rng*)

Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise2DObjective.

Parameters

in	*model*	Model object
in	*s*	The stencil computed at theta.
in,out	*rng*	A random number generator

Returns

A simulated image at theta under the noise model.

Definition at line 45 of file PoissonNoise2DObjective.h.

References mappel::generate_poisson(), and mappel::ImageFormat2DBase::size.

7.3.2.38 template<class Model , class rng_t > ModelDataT<Model> mappel::methods::simulate_image (Model & *model,* const ParamT< Model > & *theta,* rng_t & *rng*)

7.3.2.39 template<class Model > ModelDataT< Model > mappel::methods::simulate_image (Model & *model,* const StencilT< Model > & *s*)

Definition at line 36 of file model_methods_impl.h.

References simulate_image().

7.3.2.40 template<class Model > ModelDataT< Model > mappel::methods::simulate_image_from_model (Model & *model,* const ImageT< Model > & *model_im*)

Definition at line 42 of file model_methods_impl.h.

Referenced by mappel::simulate_image_stack().

7.3.2.41 template<class Model , class rng_t > ReturnIfSubclassT<ModelDataT<Model>, Model, PoissonNoise1DObjective> mappel::methods::simulate_image_from_model (const Model & *model,* const ImageT< Model > & *model_im,* rng_t & *rng*)

Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise1DObjective.

Parameters

in	*model*	Model object
in	*model_im*	An image representing the expected (mean) at each pixel under the PSF model.
in,out	*rng*	A random number generator

Returns

A simulated image corresponding to model_im under the noise model.

Definition at line 61 of file PoissonNoise1DObjective.h.

References mappel::generate_poisson().

7.3.2.42 template<class Model , class rng_t > ReturnIfSubclassT<ImageT<Model>, Model, PoissonNoise2D↩ Objective> mappel::methods::simulate_image_from_model (const Model & *model,* const ImageT< Model > & *model_im,* rng_t & *rng*)

Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise2DObjective.

Parameters

in	*model*	Model object
in	*model_im*	An image representing the expected (mean) at each pixel under the PSF model.
in,out	*rng*	A random number generator

Returns

A simulated image corresponding to model_im under the noise model.

Definition at line 64 of file PoissonNoise2DObjective.h.

References mappel::generate_poisson(), and mappel::ImageFormat2DBase::size.

7.4 mappel::methods::debug Namespace Reference

Functions

- template<class Model >
  void estimate_max_debug (Model &model, const ModelDataT< Model > &data, const std::string &method, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh, StatsT &stats)

- template<class Model >
  void estimate_max_debug (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsl, MatT &sequence, VecT &sequence_rllh, StatsT &stats)
- template<class Model >
  void estimate_mcmc_sample_debug (Model &model, const ModelDataT< Model > &data, IdxT Nsample, MatT &sample, VecT &sample_rllh, MatT &candidates, VecT &candidates_rllh)
- template<class Model >
  void estimate_mcmc_sample_debug (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample, MatT &sample, VecT &sample_rllh, MatT &candidates, VecT &candidates_rllh)

7.4.1 Function Documentation

7.4.1.1 template<class Model > void mappel::methods::debug::estimate_max_debug (Model & *model,* const ModelDataT< Model > & *data,* const std::string & *method,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsl,* MatT & *sequence,* VecT & *sequence_rllh,* StatsT & *stats*)

Definition at line 483 of file model_methods_impl.h.

7.4.1.2 template<class Model > void mappel::methods::debug::estimate_max_debug (Model & *model,* const ModelDataT< Model > & *data,* const std::string & *method,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsl,* MatT & *sequence,* VecT & *sequence_rllh,* StatsT & *stats*)

Definition at line 491 of file model_methods_impl.h.

References mappel::methods::make_estimator().

7.4.1.3 template<class Model > void mappel::methods::debug::estimate_mcmc_sample_debug (Model & *model,* const ModelDataT< Model > & *data,* IdxT *Nsample,* MatT & *sample,* VecT & *sample_rllh,* MatT & *candidates,* VecT & *candidates_rllh*)

Definition at line 504 of file model_methods_impl.h.

7.4.1.4 template<class Model > void mappel::methods::debug::estimate_mcmc_sample_debug (Model & *model,* const ModelDataT< Model > & *data,* const ParamT< Model > & *theta_init,* IdxT *Nsample,* MatT & *sample,* VecT & *sample_rllh,* MatT & *candidates,* VecT & *candidates_rllh*)

Definition at line 513 of file model_methods_impl.h.

References mappel::mcmc::sample_posterior_debug().

7.5 mappel::methods::likelihood Namespace Reference

Namespaces

- debug

Functions

- template<class Model >
ReturnIfSubclassT< double, Model, PoissonNoise1DObjective > llh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
ReturnIfSubclassT< double, Model, PoissonNoise1DObjective > rllh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
ReturnIfSubclassT< ParamT< Model >, Model, PoissonNoise1DObjective > grad (const Model &model, const ModelDataT< Model > &im, const StencilT< Model > &s)
- template<class Model >
ReturnIfSubclassT< void, Model, PoissonNoise1DObjective > grad2 (const Model &model, const ModelDataT< Model > &im, const StencilT< Model > &s, ParamT< Model > &grad_val, ParamT< Model > &grad2_val)
- template<class Model >
ReturnIfSubclassT< void, Model, PoissonNoise1DObjective > hessian (const Model &model, const ModelDataT< Model > &im, const StencilT< Model > &s, ParamT< Model > &grad_val, MatT &hess_val)
- template<class Model >
ReturnIfSubclassT< double, Model, PoissonNoise2DObjective > llh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
ReturnIfSubclassT< double, Model, PoissonNoise2DObjective > rllh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
ReturnIfSubclassT< ParamT< Model >, Model, PoissonNoise2DObjective > grad (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
ReturnIfSubclassT< void, Model, PoissonNoise2DObjective > grad2 (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad_val, ParamT< Model > &grad2_val)
- template<class Model >
ReturnIfSubclassT< void, Model, PoissonNoise2DObjective > hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad_val, MatT &hess_val)

7.5.1 Function Documentation

7.5.1.1 template<class Model > ReturnIfSubclassT<ParamT<Model>,Model,PoissonNoise1DObjective> mappel::methods::likelihood::grad (const Model & *model,* const ModelDataT< Model > & *im,* const StencilT< Model > & *s*)

Definition at line 146 of file PoissonNoise1DObjective.h.

7.5.1.2 template<class Model > ReturnIfSubclassT<ParamT<Model>,Model,PoissonNoise2DObjective> mappel::methods::likelihood::grad (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 159 of file PoissonNoise2DObjective.h.

References mappel::ImageFormat2DBase::size.

7.5.1.3 template<class Model > ReturnIfSubclassT<void,Model,PoissonNoise1DObjective> mappel::methods::likelihood::grad2 (const Model & *model,* const ModelDataT< Model > & *im,* const StencilT< Model > & *s,* ParamT< Model > & *grad_val,* ParamT< Model > & *grad2_val*)

Definition at line 163 of file PoissonNoise1DObjective.h.

7.5.1.4 template<class Model > ReturnIfSubclassT<void,Model,PoissonNoise2DObjective> mappel::methods::likelihood::grad2 (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s,* ParamT< Model > & *grad_val,* ParamT< Model > & *grad2_val*)

Definition at line 177 of file PoissonNoise2DObjective.h.

References mappel::ImageFormat2DBase::size.

7.5.1.5 template<class Model > ReturnIfSubclassT<void,Model,PoissonNoise1DObjective> mappel::methods::likelihood::hessian (const Model & *model,* const ModelDataT< Model > & *im,* const StencilT< Model > & *s,* ParamT< Model > & *grad_val,* MatT & *hess_val*)

Definition at line 186 of file PoissonNoise1DObjective.h.

Referenced by mappel::methods::aposteriori_objective(), and mappel::methods::likelihood_objective().

7.5.1.6 template<class Model > ReturnIfSubclassT<void,Model,PoissonNoise2DObjective> mappel::methods::likelihood::hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s,* ParamT< Model > & *grad_val,* MatT & *hess_val*)

Definition at line 202 of file PoissonNoise2DObjective.h.

References mappel::ImageFormat2DBase::size.

7.5.1.7 template<class Model > ReturnIfSubclassT<double,Model,PoissonNoise1DObjective> mappel::methods::likelihood::llh (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 122 of file PoissonNoise1DObjective.h.

References mappel::poisson_log_likelihood().

7.5.1.8 template<class Model > ReturnIfSubclassT<double,Model,PoissonNoise2DObjective> mappel::methods::likelihood::llh (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 131 of file PoissonNoise2DObjective.h.

References mappel::poisson_log_likelihood(), and mappel::ImageFormat2DBase::size.

7.5.1.9 template<class Model > ReturnIfSubclassT<double,Model,PoissonNoise1DObjective> mappel::methods::likelihood::rllh (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 134 of file PoissonNoise1DObjective.h.

References mappel::relative_poisson_log_likelihood().

Referenced by mappel::methods::aposteriori_objective(), and mappel::methods::likelihood_objective().

7.5.1.10 template<class Model > ReturnIfSubclassT<double,Model,PoissonNoise2DObjective> mappel::methods::likelihood::rllh (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 145 of file PoissonNoise2DObjective.h.

References mappel::relative_poisson_log_likelihood(), and mappel::ImageFormat2DBase::size.

7.6 mappel::methods::likelihood::debug Namespace Reference

Functions

- template<class Model >
  ReturnIfSubclassT< VecT, Model, PoissonNoise1DObjective > llh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, PoissonNoise1DObjective > rllh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< MatT, Model, PoissonNoise1DObjective > grad_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< CubeT, Model, PoissonNoise1DObjective > hessian_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, PoissonNoise2DObjective > llh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, PoissonNoise2DObjective > rllh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< MatT, Model, PoissonNoise2DObjective > grad_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< CubeT, Model, PoissonNoise2DObjective > hessian_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)

7.6.1 Function Documentation

7.6.1.1 template<class Model > ReturnIfSubclassT<MatT,Model,PoissonNoise1DObjective> mappel::methods::likelihood::debug::grad_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 230 of file PoissonNoise1DObjective.h.

7.6.1.2 template<class Model > ReturnIfSubclassT<MatT,Model,PoissonNoise2DObjective> mappel::methods::likelihood::debug::grad_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 255 of file PoissonNoise2DObjective.h.

References mappel::ImageFormat2DBase::size.

7.6.1.3 template<class Model > ReturnIfSubclassT<CubeT,Model,PoissonNoise1DObjective> mappel::methods::likelihood::debug::hessian_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 246 of file PoissonNoise1DObjective.h.

7.6.1.4 template<class Model > ReturnIfSubclassT<CubeT,Model,PoissonNoise2DObjective> mappel::methods::likelihood::debug::hessian_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 274 of file PoissonNoise2DObjective.h.

References mappel::ImageFormat2DBase::size.

7.6.1.5 template<class Model > ReturnIfSubclassT<VecT,Model,PoissonNoise1DObjective> mappel::methods::likelihood::debug::llh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 206 of file PoissonNoise1DObjective.h.

References mappel::poisson_log_likelihood().

7.6.1.6 template<class Model > ReturnIfSubclassT<VecT,Model,PoissonNoise2DObjective> mappel::methods::likelihood::debug::llh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 225 of file PoissonNoise2DObjective.h.

References mappel::poisson_log_likelihood(), and mappel::ImageFormat2DBase::size.

7.6.1.7 template<class Model > ReturnIfSubclassT<VecT,Model,PoissonNoise1DObjective> mappel::methods::likelihood::debug::rllh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 218 of file PoissonNoise1DObjective.h.

References mappel::relative_poisson_log_likelihood().

7.6.1.8 template<class Model > ReturnIfSubclassT<VecT,Model,PoissonNoise2DObjective> mappel::methods::likelihood::debug::rllh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 240 of file PoissonNoise2DObjective.h.

References mappel::relative_poisson_log_likelihood(), and mappel::ImageFormat2DBase::size.

7.7 mappel::methods::objective Namespace Reference

Namespaces

- debug
- openmp

Functions

- template<class Model >
  ReturnIfSubclassT< double, Model, MAPEstimator > llh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< double, Model, MAPEstimator > rllh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< ParamT< Model >, Model, MAPEstimator > grad (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< void, Model, MAPEstimator > grad2 (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, ParamT< Model > &grad2)
- template<class Model >
  ReturnIfSubclassT< void, Model, MAPEstimator > hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  ReturnIfSubclassT< double, Model, MLEstimator > llh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< double, Model, MLEstimator > rllh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< ParamT< Model >, Model, MLEstimator > grad (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)

- template<class Model >
  ReturnIfSubclassT< void, Model, MLEstimator > grad2 (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, ParamT< Model > &grad2)
- template<class Model >
  ReturnIfSubclassT< void, Model, MLEstimator > hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  double llh (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  double rllh (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  ParamT< Model > grad (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  ParamT< Model > grad2 (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  void grad2 (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, ParamT< Model > &grad_val, ParamT< Model > &grad2_val)
- template<class Model >
  MatT hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  MatT hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  void hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, MatT &hess)
- template<class Model >
  MatT negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  MatT negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  void negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, MatT &hess)

7.7.1 Function Documentation

7.7.1.1 template<class Model > ReturnIfSubclassT<ParamT<Model>, Model,MLEstimator> mappel::methods::objective::grad (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 51 of file MLEstimator.h.

7.7.1.2 template<class Model > ReturnIfSubclassT<ParamT<Model>,Model,MAPEstimator> mappel::methods::objective::grad (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 55 of file MAPEstimator.h.

Referenced by mappel::methods::aposteriori_objective(), grad(), mappel::methods::objective::openmp::grad_stack(), hessian(), mappel::methods::likelihood_objective(), mappel::QuasiNewtonMaximizer< Model >::maximize(), mappel::model_grad_stack(), mappel::model_hessian_stack(), mappel::TrustRegionMaximizer< Model >::name(), negative_definite_hessian(), mappel::PriorMAP1DObjective::prior_grad_update(), and mappel::PriorMAP1DObjective::set_hyperparameters().

7.7.1.3 template<class Model > ParamT< Model > mappel::methods::objective::grad (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 66 of file model_methods_impl.h.

References grad().

7.7.1.4 template<class Model > ReturnIfSubclassT<void,Model,MLEstimator> mappel::methods::objective::grad2 (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s,* ParamT< Model > & *grad,* ParamT< Model > & *grad2*)

Definition at line 58 of file MLEstimator.h.

7.7.1.5 template<class Model > ReturnIfSubclassT<void,Model,MAPEstimator> mappel::methods::objective::grad2 (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s,* ParamT< Model > & *grad,* ParamT< Model > & *grad2*)

Definition at line 64 of file MAPEstimator.h.

Referenced by grad2(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::name(), mappel::PriorMAP1DObjective::prior_grad2_update(), and mappel::PriorMAP1DObjective::set_hyperparameters().

7.7.1.6 template<class Model > ParamT< Model > mappel::methods::objective::grad2 (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 78 of file model_methods_impl.h.

References grad2().

7.7.1.7 template<class Model > void mappel::methods::objective::grad2 (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta,* ParamT< Model > & *grad_val,* ParamT< Model > & *grad2_val*)

Definition at line 93 of file model_methods_impl.h.

References grad2().

7.7.1.8 template<class Model > ReturnIfSubclassT<void,Model,MLEstimator> mappel::methods::objective::hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 65 of file MLEstimator.h.

7.7.1.9 template<class Model > ReturnIfSubclassT<void,Model,MAPEstimator> mappel::methods::objective::hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 72 of file MAPEstimator.h.

Referenced by hessian(), mappel::methods::objective::openmp::hessian_stack(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), negative_definite_hessian(), and mappel::methods::observed_information().

7.7.1.10 template<class Model > MatT mappel::methods::objective::hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 101 of file model_methods_impl.h.

References hessian().

7.7.1.11 template<class Model > MatT mappel::methods::objective::hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 113 of file model_methods_impl.h.

References grad(), and hessian().

7.7.1.12 template<class Model > void mappel::methods::objective::hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 123 of file model_methods_impl.h.

References grad(), and hessian().

7.7.1.13 template<class Model > void mappel::methods::objective::hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta,* MatT & *hess*)

Definition at line 135 of file model_methods_impl.h.

References grad(), and hessian().

7.7.1.14 template<class Model > ReturnIfSubclassT<double,Model,MAPEstimator> mappel::methods::objective::llh (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 36 of file MAPEstimator.h.

Referenced by llh(), mappel::methods::objective::openmp::llh_stack(), and log_likelihood().

7.7.1.15 template<class Model > ReturnIfSubclassT<double,Model,MLEstimator> mappel::methods::objective::llh (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 37 of file MLEstimator.h.

7.7.1.16 template<class Model > double mappel::methods::objective::llh (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 50 of file model_methods_impl.h.

References llh().

7.7.1.17 template<class Model > MatT mappel::methods::objective::negative_definite_hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 143 of file model_methods_impl.h.

Referenced by negative_definite_hessian(), and mappel::methods::objective::openmp::negative_definite_hessian_↩ stack().

7.7.1.18 template<class Model > MatT mappel::methods::objective::negative_definite_hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 155 of file model_methods_impl.h.

References grad(), and negative_definite_hessian().

7.7.1.19 template<class Model > void mappel::methods::objective::negative_definite_hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 165 of file model_methods_impl.h.

References grad(), and negative_definite_hessian().

7.7.1.20 template<class Model > void mappel::methods::objective::negative_definite_hessian (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s,* ParamT< Model > & *grad,* MatT & *hess*)

Definition at line 178 of file model_methods_impl.h.

References mappel::cholesky_make_negative_definite(), and hessian().

7.7.1.21 template<class Model > ReturnIfSubclassT<double,Model,MLEstimator> mappel::methods::objective::rllh (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 44 of file MLEstimator.h.

7.7.1.22 template<class Model > ReturnIfSubclassT<double,Model,MAPEstimator> mappel::methods::objective::rllh (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 48 of file MAPEstimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::methods::aposteriori_objective(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::Estimator< Model >::estimate_max(), mappel::Estimator< Model >::estimate_max_debug(), mappel::methods::likelihood_objective(), mappel::TrustRegionMaximizer< Model >::maximize(), mappel::HeuristicEstimator< Model >::name(), mappel::CGaussHeuristicEstimator< Model >::name(), mappel::CGaussMLE< Model >::name(), mappel::PriorMAP1DObjective::prior_log_likelihood(), relative_log_likelihood(), rllh(), mappel::methods::objective::openmp::rllh_stack(), mappel::mcmc::sample_posterior(), mappel::mcmc::sample_posterior_debug(), mappel::SimulatedAnnealingMaximizer< Model >::SimulatedAnnealingMaximizer(), and mappel::Estimator< Model >::~Estimator().

7.7.1.23 template<class Model > double mappel::methods::objective::rllh (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 58 of file model_methods_impl.h.

References rllh().

7.8 mappel::methods::objective::debug Namespace Reference

Functions

- template<class Model >
  ReturnIfSubclassT< VecT, Model, MAPEstimator > llh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, MAPEstimator > rllh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< MatT, Model, MAPEstimator > grad_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< CubeT, Model, MAPEstimator > hessian_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, MLEstimator > llh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, MLEstimator > rllh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< MatT, Model, MLEstimator > grad_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< CubeT, Model, MLEstimator > hessian_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)

- template<class Model >
  VecT llh_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  VecT rllh_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  MatT grad_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  CubeT hessian_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)

7.8.1 Function Documentation

7.8.1.1 template<class Model > ReturnIfSubclassT<MatT,Model,MLEstimator> mappel::methods::objective::debug::grad_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 88 of file MLEstimator.h.

7.8.1.2 template<class Model > ReturnIfSubclassT<MatT,Model,MAPEstimator> mappel::methods::objective::debug::grad_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 96 of file MAPEstimator.h.

Referenced by grad_components().

7.8.1.3 template<class Model > MatT mappel::methods::objective::debug::grad_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 202 of file model_methods_impl.h.

References grad_components().

7.8.1.4 template<class Model > ReturnIfSubclassT<CubeT,Model,MLEstimator> mappel::methods::objective::debug::hessian_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 95 of file MLEstimator.h.

7.8.1.5 template<class Model > ReturnIfSubclassT<CubeT,Model,MAPEstimator> mappel::methods::objective::debug::hessian_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 103 of file MAPEstimator.h.

Referenced by hessian_components().

7.8.1.6 template<class Model > CubeT mappel::methods::objective::debug::hessian_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 209 of file model_methods_impl.h.

References hessian_components().

7.8.1.7 template<class Model > ReturnIfSubclassT<VecT,Model,MLEstimator> mappel::methods::objective::debug::llh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 74 of file MLEstimator.h.

7.8.1.8 template<class Model > ReturnIfSubclassT<VecT,Model,MAPEstimator> mappel::methods::objective::debug::llh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 82 of file MAPEstimator.h.

Referenced by llh_components().

7.8.1.9 template<class Model > VecT mappel::methods::objective::debug::llh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 188 of file model_methods_impl.h.

References llh_components().

7.8.1.10 template<class Model > ReturnIfSubclassT<VecT,Model,MLEstimator> mappel::methods::objective::debug::rllh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 81 of file MLEstimator.h.

7.8.1.11 template<class Model > ReturnIfSubclassT<VecT,Model,MAPEstimator> mappel::methods::objective::debug::rllh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const StencilT< Model > & *s*)

Definition at line 89 of file MAPEstimator.h.

Referenced by rllh_components().

7.8.1.12 template<class Model > VecT mappel::methods::objective::debug::rllh_components (const Model & *model,* const ModelDataT< Model > & *data_im,* const ParamT< Model > & *theta*)

Definition at line 195 of file model_methods_impl.h.

References rllh_components().

7.9 mappel::methods::objective::openmp Namespace Reference

Functions

- template<class Model >
  void llh_stack (const Model &model, const ImageT< Model > &image, const ParamVecT< Model > &theta_↩
  stack, VecT &llh_stack)

  Parallel log_likelihood calculations for a single image.
- template<class Model >
  void llh_stack (const Model &model, const ImageStackT< Model > &image_stack, const ParamVecT< Model >
  &theta_stack, VecT &llh_stack)

  Parallel log_likelihood calculations for a stack of images.
- template<class Model >
  void rllh_stack (const Model &model, const ImageStackT< Model > &image_stack, const ParamVecT< Model >
  &theta_stack, VecT &rllh_stack)

  Parallel relative log_likelihood calculations for a stack of images.
- template<class Model >
  void rllh_stack (const Model &model, const ImageT< Model > &image, const ParamVecT< Model > &theta_↩
  stack, VecT &rllh_stack)
- template<class Model >
  void grad_stack (const Model &model, const ImageStackT< Model > &image_stack, const ParamVecT< Model
  > &theta_stack, ParamVecT< Model > &grad_stack)

  Parallel model gradient calculations for a stack of images.
- template<class Model >
  void hessian_stack (const Model &model, const ImageStackT< Model > &image_stack, const ParamVecT<
  Model > &theta_stack, CubeT &hessian_stack)

  Parallel model Hessian calculations for a stack of images.
- template<class Model >
  void negative_definite_hessian_stack (const Model &model, const ImageStackT< Model > &image_stack, const
  ParamVecT< Model > &theta_stack, CubeT &hessian_stack)

  Parallel model negative_definite Hessian approximation calculations for a stack of images.

7.9.1 Function Documentation

7.9.1.1 template<class Model > void mappel::methods::objective::openmp::grad_stack (const Model & *model,* const ImageStackT< Model > & *image_stack,* const ParamVecT< Model > & *theta_stack,* ParamVecT< Model > & *grad_stack*)

Parallel model gradient calculations for a stack of images.

Compute gradient of log-likelihood for multiple image, theta pairs.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model gradients.

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image_stack*	Sequence of images.
in	*theta_stack*	Sequence of thetas.
out	*grad_stack*	Sequence of grad vectors values computed. Size: [model.num_params, n]

Definition at line 542 of file openmp_methods.h.

References mappel::methods::objective::grad(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

7.9.1.2 template<class Model > void mappel::methods::objective::openmp::hessian_stack (const Model & *model*, const ImageStackT< Model > & *image_stack*, const ParamVecT< Model > & *theta_stack*, CubeT & *hessian_stack*)

Parallel model Hessian calculations for a stack of images.

Compute Hessian of log-likelihood for multiple image, theta pairs.

Use: model.make_param_mat_stack() to make a parameter matrix stack of appropriate dimensions for the model Hessian.

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image_stack*	Sequence of images.
in	*theta_stack*	Sequence of thetas. Size: [model.num_params, nThetas]
out	*hess_stack*	Sequence of Hessian matrices computed. Size: [model.num_params, model.num_params, n]

Definition at line 590 of file openmp_methods.h.

References mappel::methods::objective::hessian(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

7.9.1.3 template<class Model > void mappel::methods::objective::openmp::llh_stack (const Model & *model*, const ImageT< Model > & *image*, const ParamVecT< Model > & *theta_stack*, VecT & *llh_stack*)

Parallel log_likelihood calculations for a single image.

Compute log-likelihood for multiple thetas using the same image

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image*	An image.
in	*theta_stack*	Sequence of thetas. Size: [model.num_params, nThetas]
out	*llh_stack*	Sequence of llh values computed.

Definition at line 406 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

Referenced by mappel::log_likelihood_stack().

7.9.1.4 template<class Model > void mappel::methods::objective::openmp::llh_stack (const Model & *model,* const ImageStackT< Model > & *image_stack,* const ParamVecT< Model > & *theta_stack,* VecT & *llh_stack*)

Parallel log_likelihood calculations for a stack of images.

Compute log-likelihood for multiple image, theta pairs.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image_stack*	Sequence of images.
in	*theta_stack*	Sequence of thetas. Size: [model.num_params, nThetas]
out	*llh_stack*	Sequence of llh values computed. Size: [n]

Definition at line 431 of file openmp_methods.h.

References mappel::methods::objective::llh(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

7.9.1.5 template<class Model > void mappel::methods::objective::openmp::negative_definite_hessian_stack (const Model & *model,* const ImageStackT< Model > & *image_stack,* const ParamVecT< Model > & *theta_stack,* CubeT & *hessian_stack*)

Parallel model negative_definite Hessian approximation calculations for a stack of images.

Compute Hessian a negative_definite Hessian using a modified cholesky decompositions. Computes for multiple image, theta pairs.

Use: model.make_param_mat_stack() to make a parameter matrix stack of appropriate dimensions for the model Hessian.

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image_stack*	Sequence of images.
in	*theta_stack*	Sequence of thetas. Size: [model.num_params, nThetas]
out	*hess_stack*	Sequence of approximate Hessian negative definite matrices computed. Size: [model.num_params, model.num_params, n]

Definition at line 639 of file openmp_methods.h.

References mappel::methods::objective::negative_definite_hessian(), omp_exception_catcher::impl_::OMPException↩Catcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

7.9.1.6 template<class Model > void mappel::methods::objective::openmp::rllh_stack (const Model & *model,* const ImageStackT< Model > & *image_stack,* const ParamVecT< Model > & *theta_stack,* VecT & *rllh_stack*)

Parallel relative log_likelihood calculations for a stack of images.

Compute relative log-likelihood for multiple image, theta pairs.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*image_stack*	Sequence of images.
in	*theta_stack*	Sequence of thetas. Size: [model.num_params, nThetas]
out	*rllh_stack*	Sequence of rllh values computed. Size: [n]

Definition at line 478 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), mappel::methods↩::objective::rllh(), rllh_stack(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

Referenced by mappel::CGaussMLE< Model >::compute_estimate_debug(), and mappel::Estimator< Model >::~Estimator().

7.9.1.7 template<class Model > void mappel::methods::objective::openmp::rllh_stack (const Model & *model,* const ImageT< Model > & *image,* const ParamVecT< Model > & *theta_stack,* VecT & *rllh_stack*)

Definition at line 514 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

Referenced by rllh_stack().

7.10 mappel::methods::openmp Namespace Reference

Functions

- template<class Model >
  void sample_prior_stack (Model &model, ParamVecT< Model > &theta_stack)

  Parallel sampling of the model prior.
- template<class Model >
  void model_image_stack (const Model &model, const ParamVecT< Model > &theta_stack, ImageStackT< Model > &image_stack)

  Parallel computation of the model image.
- template<class Model >
  void simulate_image_stack (Model &model, const ParamVecT< Model > &theta_stack, ImageStackT< Model > &image_stack)

  Parallel simulation of images from one or more theta.
- template<class Model >
  void cr_lower_bound_stack (const Model &model, const ParamVecT< Model > &theta_stack, ParamVecT< Model > &crlb_stack)
- template<class Model >
  void expected_information_stack (const Model &model, const ParamVecT< Model > &theta_stack, CubeT &fisherI_stack)
- template<class Model >
  void estimate_max_stack (Model &model, const ModelDataStackT< Model > &data_stack, const std::string &method, ParamVecT< Model > &theta_max_stack, VecT &theta_max_rllh, CubeT &obsI_stack)
- template<class Model >
  void estimate_max_stack (Model &model, const ModelDataStackT< Model > &data_stack, const std::string &method, ParamVecT< Model > &theta_max_stack, VecT &theta_max_rllh, CubeT &obsI_stack, StatsT &stats)
- template<class Model >
  void estimate_max_stack (Model &model, const ModelDataStackT< Model > &data_stack, const std::string &method, ParamVecT< Model > &theta_init_stack, ParamVecT< Model > &theta_max_stack, VecT &theta_max_rllh, CubeT &obsI_stack)
- template<class Model >
  void estimate_max_stack (Model &model, const ModelDataStackT< Model > &data_stack, const std::string &method, ParamVecT< Model > &theta_init_stack, ParamVecT< Model > &theta_max_stack, VecT &theta_max_rllh, CubeT &obsI_stack, StatsT &stats)

- template<class Model >
  void estimate_profile_likelihood (Model &model, const ModelDataT< Model > &data, const IdxVecT &fixed_↩
  parameters, const MatT &fixed_values, const std::string &method, VecT &profile_likelihood, ParamVecT< Model
  > &profile_parameters)
- template<class Model >
  void estimate_profile_likelihood (Model &model, const ModelDataT< Model > &data, const IdxVecT &fixed_↩
  parameters, const MatT &fixed_values, const std::string &method, VecT &profile_likelihood, ParamVecT< Model
  > &profile_parameters, StatsT &stats)
- template<class Model >
  void estimate_profile_likelihood (Model &model, const ModelDataT< Model > &data, const IdxVecT &fixed_↩
  parameters, const MatT &fixed_values, const std::string &method, const ParamVecT< Model > &theta_init, VecT
  &profile_likelihood, ParamVecT< Model > &profile_parameters)
- template<class Model >
  void estimate_profile_likelihood (Model &model, const ModelDataT< Model > &data, const IdxVecT &fixed_↩
  parameters, const MatT &fixed_values, const std::string &method, const ParamVecT< Model > &theta_init, VecT
  &profile_likelihood, ParamVecT< Model > &profile_parameters, StatsT &stats)
- template<class Model >
  void estimate_mcmc_sample_stack (Model &model, const ModelDataStackT< Model > &data_stack, const
  ParamVecT< Model > &theta_init_stack, IdxT Nsamples, IdxT Nburnin, IdxT thin, CubeT &sample_stack, MatT
  &sample_rllh_stack)
- template<class Model >
  void estimate_mcmc_sample_stack (Model &model, const ModelDataStackT< Model > &data_stack, IdxT
  Nsamples, IdxT Nburnin, IdxT thin, CubeT &sample, MatT &sample_rllh)
- template<class Model >
  void estimate_mcmc_posterior_stack (Model &model, const ModelDataStackT< Model > &data_stack, const
  ParamVecT< Model > &theta_init_stack, IdxT Nsamples, IdxT Nburnin, IdxT thin, MatT &theta_mean_stack,
  CubeT &theta_cov_stack)
- template<class Model >
  void estimate_mcmc_posterior_stack (Model &model, const ModelDataStackT< Model > &data_stack, IdxT
  Nsamples, IdxT Nburnin, IdxT thin, MatT &theta_mean_stack, CubeT &theta_cov_stack)
- template<class Model >
  void error_bounds_expected_stack (const Model &model, const MatT &theta_est_stack, double confidence, MatT
  &theta_lb_stack, MatT &theta_ub_stack)
- template<class Model >
  void error_bounds_observed_stack (const Model &model, const MatT &theta_est_stack, CubeT &obsI_stack,
  double confidence, MatT &theta_lb_stack, MatT &theta_ub_stack)
- template<class Model >
  void error_bounds_posterior_credible_stack (const Model &model, const CubeT &sample_stack, double confi-
  dence, MatT &theta_mean_stack, MatT &theta_lb_stack, MatT &theta_ub_stack)

7.10.1 Function Documentation

7.10.1.1 template<class Model > void mappel::methods::openmp::cr_lower_bound_stack (const Model & *model,* const ParamVecT< Model > & *theta_stack,* ParamVecT< Model > & *crlb_stack*)

Definition at line 135 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_↩
catcher::impl_::OMPExceptionCatcher< IntType >::run().

Referenced by error_bounds_expected_stack().

7.10.1.2 template<class Model > void mappel::methods::openmp::error_bounds_expected_stack (const Model & *model,* const MatT & *theta_est_stack,* double *confidence,* MatT & *theta_lb_stack,* MatT & *theta_ub_stack*)

Definition at line 312 of file openmp_methods.h.

References cr_lower_bound_stack(), and mappel::normal_quantile_twosided().

7.10.1.3 template<class Model > void mappel::methods::openmp::error_bounds_observed_stack (const Model & *model,* const MatT & *theta_est_stack,* CubeT & *obsl_stack,* double *confidence,* MatT & *theta_lb_stack,* MatT & *theta_ub_stack*)

Definition at line 327 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

7.10.1.4 template<class Model > void mappel::methods::openmp::error_bounds_posterior_credible_stack (const Model & *model,* const CubeT & *sample_stack,* double *confidence,* MatT & *theta_mean_stack,* MatT & *theta_lb_stack,* MatT & *theta_ub_stack*)

Definition at line 358 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

7.10.1.5 template<class Model > void mappel::methods::openmp::estimate_max_stack (Model & *model,* const ModelDataStackT< Model > & *data_stack,* const std::string & *method,* ParamVecT< Model > & *theta_max_stack,* VecT & *theta_max_rllh,* CubeT & *obsl_stack*)

Definition at line 165 of file openmp_methods.h.

References mappel::methods::make_estimator().

Referenced by mappel::Estimator< Model >::estimate_max_stack().

7.10.1.6 template<class Model > void mappel::methods::openmp::estimate_max_stack (Model & *model,* const ModelDataStackT< Model > & *data_stack,* const std::string & *method,* ParamVecT< Model > & *theta_max_stack,* VecT & *theta_max_rllh,* CubeT & *obsl_stack,* StatsT & *stats*)

Definition at line 173 of file openmp_methods.h.

References mappel::methods::make_estimator().

7.10.1.7 template<class Model > void mappel::methods::openmp::estimate_max_stack (Model & *model,* const ModelDataStackT< Model > & *data_stack,* const std::string & *method,* ParamVecT< Model > & *theta_init_stack,* ParamVecT< Model > & *theta_max_stack,* VecT & *theta_max_rllh,* CubeT & *obsl_stack*)

Definition at line 182 of file openmp_methods.h.

References mappel::methods::make_estimator().

7.10.1.8 template<class Model > void mappel::methods::openmp::estimate_max_stack (Model & *model,* const ModelDataStackT< Model > & *data_stack,* const std::string & *method,* ParamVecT< Model > & *theta_init_stack,* ParamVecT< Model > & *theta_max_stack,* VecT & *theta_max_rllh,* CubeT & *obsl_stack,* StatsT & *stats*)

Definition at line 190 of file openmp_methods.h.

References mappel::methods::make_estimator().

7.10.1.9 template<class Model > void mappel::methods::openmp::estimate_mcmc_posterior_stack (Model & *model,* const ModelDataStackT< Model > & *data_stack,* const ParamVecT< Model > & *theta_init_stack,* IdxT *Nsamples,* IdxT *Nburnin,* IdxT *thin,* MatT & *theta_mean_stack,* CubeT & *theta_cov_stack*)

Definition at line 275 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

Referenced by estimate_mcmc_posterior_stack().

7.10.1.10 template<class Model > void mappel::methods::openmp::estimate_mcmc_posterior_stack (Model & *model,* const ModelDataStackT< Model > & *data_stack,* IdxT *Nsamples,* IdxT *Nburnin,* IdxT *thin,* MatT & *theta_mean_stack,* CubeT & *theta_cov_stack*)

Definition at line 303 of file openmp_methods.h.

References estimate_mcmc_posterior_stack().

7.10.1.11 template<class Model > void mappel::methods::openmp::estimate_mcmc_sample_stack (Model & *model,* const ModelDataStackT< Model > & *data_stack,* const ParamVecT< Model > & *theta_init_stack,* IdxT *Nsamples,* IdxT *Nburnin,* IdxT *thin,* CubeT & *sample_stack,* MatT & *sample_rllh_stack*)

Definition at line 241 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

Referenced by estimate_mcmc_sample_stack().

7.10.1.12 template<class Model > void mappel::methods::openmp::estimate_mcmc_sample_stack (Model & *model,* const ModelDataStackT< Model > & *data_stack,* IdxT *Nsamples,* IdxT *Nburnin,* IdxT *thin,* CubeT & *sample,* MatT & *sample_rllh*)

Definition at line 266 of file openmp_methods.h.

References estimate_mcmc_sample_stack().

7.10.1.13 template<class Model > void mappel::methods::openmp::estimate_profile_likelihood (Model & *model,* const ModelDataT< Model > & *data,* const IdxVecT & *fixed_parameters,* const MatT & *fixed_values,* const std::string & *method,* VecT & *profile_likelihood,* ParamVecT< Model > & *profile_parameters*)

Definition at line 200 of file openmp_methods.h.

References mappel::methods::make_estimator().

7.10.1.14 template<class Model > void mappel::methods::openmp::estimate_profile_likelihood (Model & *model*, const ModelDataT< Model > & *data*, const IdxVecT & *fixed_parameters*, const MatT & *fixed_values*, const std::string & *method*, VecT & *profile_likelihood*, ParamVecT< Model > & *profile_parameters*, StatsT & *stats*)

Definition at line 210 of file openmp_methods.h.

References mappel::methods::make_estimator().

7.10.1.15 template<class Model > void mappel::methods::openmp::estimate_profile_likelihood (Model & *model*, const ModelDataT< Model > & *data*, const IdxVecT & *fixed_parameters*, const MatT & *fixed_values*, const std::string & *method*, const ParamVecT< Model > & *theta_init*, VecT & *profile_likelihood*, ParamVecT< Model > & *profile_parameters*)

Definition at line 221 of file openmp_methods.h.

References mappel::methods::make_estimator().

7.10.1.16 template<class Model > void mappel::methods::openmp::estimate_profile_likelihood (Model & *model*, const ModelDataT< Model > & *data*, const IdxVecT & *fixed_parameters*, const MatT & *fixed_values*, const std::string & *method*, const ParamVecT< Model > & *theta_init*, VecT & *profile_likelihood*, ParamVecT< Model > & *profile_parameters*, StatsT & *stats*)

Definition at line 231 of file openmp_methods.h.

References mappel::methods::make_estimator().

7.10.1.17 template<class Model > void mappel::methods::openmp::expected_information_stack (const Model & *model*, const ParamVecT< Model > & *theta_stack*, CubeT & *fisherI_stack*)

Definition at line 150 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

7.10.1.18 template<class Model > void mappel::methods::openmp::model_image_stack (const Model & *model*, const ParamVecT< Model > & *theta_stack*, ImageStackT< Model > & *image_stack*)

Parallel computation of the model image.

The model image is the expected photon count at each pixel under parameter theta.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model Use: model.make_image_stack() to make an image stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*theta_stack*	Sequence of thetas for which to generate images. Size: [model.num_params, nThetas]
out	*image_stack*	Sequence of model images generated.

Definition at line 70 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

7.10.1.19 template<class Model > void mappel::methods::openmp::sample_prior_stack (Model & *model,* ParamVecT< Model > & *theta_stack*)

Parallel sampling of the model prior.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model,A*	PointEmitterModel object.
out	*theta_stack,A*	sequence of sampled thetas. Size: [model.num_params, nSamples]

Definition at line 42 of file openmp_methods.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

7.10.1.20 template<class Model > void mappel::methods::openmp::simulate_image_stack (Model & *model,* const ParamVecT< Model > & *theta_stack,* ImageStackT< Model > & *image_stack*)

Parallel simulation of images from one or more theta.

This accepts either a single theta and a stack of images, or a stack of thetas and a stack of images.

Use: model.make_param_stack() to make a parameter stack of appropriate dimensions for the model Use: model.make_image_stack() to make an image stack of appropriate dimensions for the model

Template Parameters

Model	A concrete subclass of PointEmitterModel

Parameters

in	*model*	A PointEmitterModel object.
in	*theta_stack*	Single theta or a sequence of thetas. Size: [model.num_params, nThetas]
out	*image_stack*	Sequence of model images generated.

Definition at line 97 of file openmp_methods.h.

References mappel::methods::model_image(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run(), and mappel::methods::simulate_image().

7.11 omp_exception_catcher Namespace Reference

Namespaces

- impl_

Typedefs

- using OMPExceptionCatcher = impl_::OMPExceptionCatcher< uint32_t >

7.11.1 Typedef Documentation

7.11.1.1 using omp_exception_catcher::OMPExceptionCatcher = typedef impl_::OMPExceptionCatcher<uint32_t>

Definition at line 94 of file OMPExceptionCatcher.h.

7.12 omp_exception_catcher::impl_ Namespace Reference

Classes

- class OMPExceptionCatcher

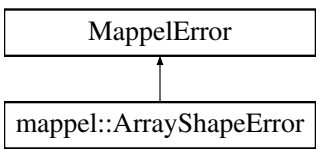
8 Class Documentation

8.1 mappel::ArrayShapeError Struct Reference

Array is not of the right dimensionality.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/util.h>`

Inheritance diagram for mappel::ArrayShapeError:



Public Member Functions

- ArrayShapeError (std::string message)

8.1.1 Detailed Description

Array is not of the right dimensionality.

Definition at line 72 of file util.h.

8.1.2 Constructor & Destructor Documentation

8.1.2.1 mappel::ArrayShapeError::ArrayShapeError (std::string *message*) [inline]

Definition at line 74 of file util.h.

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

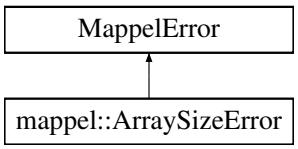
- util.h

8.2 mappel::ArraySizeError Struct Reference

Array is not of the right size.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/util.h>`

Inheritance diagram for mappel::ArraySizeError:



Public Member Functions

- ArraySizeError (std::string message)

8.2.1 Detailed Description

Array is not of the right size.

Definition at line 79 of file util.h.

8.2.2 Constructor & Destructor Documentation

8.2.2.1 mappel::ArraySizeError::ArraySizeError (std::string *message*) [inline]

Definition at line 81 of file util.h.

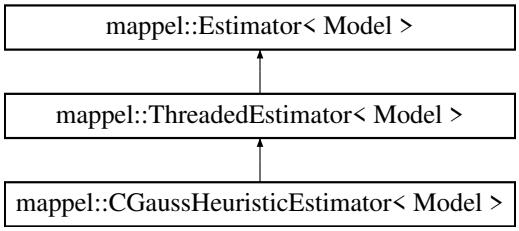
The documentation for this struct was generated from the following file:

- util.h

8.3 mappel::CGaussHeuristicEstimator< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::CGaussHeuristicEstimator< Model >:



Public Member Functions

- CGaussHeuristicEstimator (Model &model)
- std::string name () const
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩ stack, VecT &rllh_stack, CubeT &obsI_stack)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_↩ parameters)
- StatsT get_stats ()
- StatsT get_debug_stats ()
- void clear_stats ()
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)

Protected Member Functions

- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- virtual StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- virtual void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.3.1 Detailed Description

template<class Model>
class mappel::CGaussHeuristicEstimator< Model >

Definition at line 143 of file estimator.h.

8.3.2 Constructor & Destructor Documentation

8.3.2.1 template<class Model > mappel::CGaussHeuristicEstimator< Model >::CGaussHeuristicEstimator (Model & *model*) [inline]

Definition at line 145 of file estimator.h.

8.3.3 Member Function Documentation

8.3.3.1 template<class Model > void mappel::ThreadedEstimator< Model >::clear_stats ( ) [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 287 of file estimator_impl.h.

References mappel::cgauss_heuristic_compute_estimate(), mappel::Estimator< Model >::clear_stats(), mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, and mappel::methods::objective::rllh().

Referenced by mappel::IterativeMaximizer< Model >::clear_stats().

8.3.3.2 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamT< Model > & *theta_est*, double & *rllh*, MatT & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.3.3.3 template<class Model > StencilT< Model > mappel::Estimator< Model >::compute_estimate_debug (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamVecT< Model > & *sequence*, VecT & *sequence_rllh*) [inline], [protected], [virtual], [inherited]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented in mappel::IterativeMaximizer< Model >, mappel::SimulatedAnnealingMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 192 of file estimator_impl.h.

Referenced by mappel::CGaussMLE< Model >::name(), mappel::SimulatedAnnealingMaximizer< Model >::↩ SimulatedAnnealingMaximizer(), and mappel::Estimator< Model >::~Estimator().

8.3.3.4 template<class Model > void mappel::Estimator< Model >::compute_profile_estimate (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, const IdxVecT & *fixed_parameters*, ParamT< Model > & *theta_est*, double & *rllh*) [protected], [virtual], [inherited]

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 151 of file estimator_impl.h.

References mappel::Estimator< Model >::name().

Referenced by mappel::Estimator< Model >::~Estimator().

8.3.3.5 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.3.3.6 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.3.3.7 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.3.3.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.3.3.9 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.3.3.10 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.3.3.11 template<class Model > void mappel::Estimator< Model >::estimate_max_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI,* MatT & *sequence,* VecT & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.3.3.12 template<class Model > void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack,* ParamVecT< Model > & *theta_est_stack,* VecT & *rllh_stack,* CubeT & *obsI_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.3.3.13 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im,* const ParamVecT< Model > & *theta_init,* ParamVecT< Model > & *theta,* VecT & *rllh,* CubeT & *obsI*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.3.3.14 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_profile_stack (const ModelDataT< Model > & *data,* const IdxVecT & *fixed_parameters,* const MatT & *values,* const ParamVecT< Model > & *theta_init,* VecT & *profile_likelihood,* ParamVecT< Model > & *profile_parameters*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.3.3.15 template<class Model > StatsT mappel::ThreadedEstimator< Model >::get_debug_stats ( ) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 281 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::get_stats().

8.3.3.16 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.3.3.17 template<class Model > StatsT mappel::ThreadedEstimator< Model >::get_stats ( ) [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 271 of file estimator_impl.h.

References mappel::Estimator< Model >::get_stats(), mappel::Estimator< Model >::num_estimations, mappel::ThreadedEstimator< Model >::num_threads, and mappel::Estimator< Model >::total_walltime.

Referenced by mappel::ThreadedEstimator< Model >::get_debug_stats(), mappel::CGaussMLE< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.3.3.18 template<class Model > std::string mappel::CGaussHeuristicEstimator< Model >::name ( ) const [inline], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 147 of file estimator.h.

References mappel::Estimator< Model >::compute_estimate(), and mappel::methods::objective::rllh().

8.3.3.19 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.3.3.20 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.3.4 Member Data Documentation

8.3.4.1 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected], [inherited]

Definition at line 127 of file estimator.h.

8.3.4.2 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.3.4.3 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected], [inherited]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.3.4.4 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.3.4.5 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected], [inherited]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.3.4.6 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

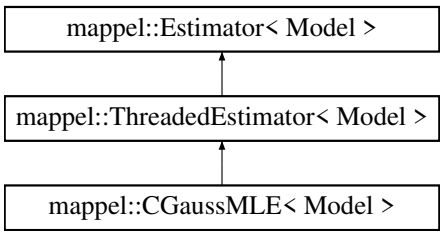
The documentation for this class was generated from the following files:

- estimator.h
- estimator_impl.h

8.4 mappel::CGaussMLE< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::CGaussMLE< Model >:



Public Member Functions

- CGaussMLE (Model &model, int max_iterations=DEFAULT_CGAUSS_ITERATIONS)
- StatsT get_stats ()
- StatsT get_debug_stats ()
- std::string name () const
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_stack, VecT &rllh_stack, CubeT &obsI_stack)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_parameters)

- void clear_stats ()
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)

Public Attributes

- int max_iterations

Protected Member Functions

- StencilT< Model > compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- virtual void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.4.1 Detailed Description

template<class Model>
class mappel::CGaussMLE< Model >

Definition at line 155 of file estimator.h.

8.4.2 Constructor & Destructor Documentation

8.4.2.1 template<class Model > mappel::CGaussMLE< Model >::CGaussMLE (Model & *model,* int *max_iterations =* DEFAULT_CGAUSS_ITERATIONS) [inline]

Definition at line 158 of file estimator.h.

References mappel::Estimator< Model >::get_debug_stats(), and mappel::Estimator< Model >::get_stats().

8.4.3 Member Function Documentation

8.4.3.1 template<class Model > void mappel::ThreadedEstimator< Model >::clear_stats ( ) [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 287 of file estimator_impl.h.

References mappel::cgauss_heuristic_compute_estimate(), mappel::Estimator< Model >::clear_stats(), mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, and mappel::methods::objective::rllh().

Referenced by mappel::IterativeMaximizer< Model >::clear_stats().

8.4.3.2 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.4.3.3 template<class Model > StencilT< Model > mappel::CGaussMLE< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [protected], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 341 of file estimator_impl.h.

References mappel::cgauss_compute_estimate(), mappel::cgauss_heuristic_compute_estimate(), mappel::Estimator< Model >::model, and mappel::methods::objective::rllh().

8.4.3.4 template<class Model > StencilT< Model > mappel::CGaussMLE< Model >::compute_estimate_debug (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamVecT< Model > & *sequence*, VecT & *sequence_rllh*) [protected], [virtual]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented from mappel::Estimator< Model >.

Definition at line 366 of file estimator_impl.h.

References mappel::cgauss_compute_estimate_debug(), mappel::cgauss_heuristic_compute_estimate(), mappel::Estimator< Model >::model, and mappel::methods::objective::openmp::rllh_stack().

8.4.3.5 template<class Model > void mappel::Estimator< Model >::compute_profile_estimate (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, const IdxVecT & *fixed_parameters*, ParamT< Model > & *theta_est*, double & *rllh*) [protected], [virtual], [inherited]

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 151 of file estimator_impl.h.

References mappel::Estimator< Model >::name().

Referenced by mappel::Estimator< Model >::~Estimator().

8.4.3.6 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.4.3.7 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.4.3.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.4.3.9 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.4.3.10 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, ParamT< Model > & *theta*, double & *rllh*, MatT & *obsI*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.4.3.11 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamT< Model > & *theta*, double & *rllh*, MatT & *obsI*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.4.3.12 template<class Model > void mappel::Estimator< Model >::estimate_max_debug (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamT< Model > & *theta_est*, double & *rllh*, MatT & *obsI*, MatT & *sequence*, VecT & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.4.3.13 template<class Model > void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack*, ParamVecT< Model > & *theta_est_stack*, VecT & *rllh_stack*, CubeT & *obsI_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.4.3.14 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im*, const ParamVecT< Model > & *theta_init*, ParamVecT< Model > & *theta*, VecT & *rllh*, CubeT & *obsI*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.4.3.15 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_profile_stack (const ModelDataT< Model > & *data*, const IdxVecT & *fixed_parameters*, const MatT & *values*, const ParamVecT< Model > & *theta_init*, VecT & *profile_likelihood*, ParamVecT< Model > & *profile_parameters*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.4.3.16 template<class Model > StatsT mappel::CGaussMLE< Model >::get_debug_stats ( ) [virtual]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 332 of file estimator_impl.h.

References mappel::CGaussMLE< Model >::get_stats().

8.4.3.17 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.4.3.18 template<class Model > StatsT mappel::CGaussMLE< Model >::get_stats ( ) [virtual]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 321 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::get_stats().

Referenced by mappel::CGaussMLE< Model >::get_debug_stats().

8.4.3.19 template<class Model > std::string mappel::CGaussMLE< Model >::name ( ) const [inline], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 164 of file estimator.h.

References mappel::Estimator< Model >::compute_estimate(), mappel::Estimator< Model >::compute_estimate_↩debug(), and mappel::methods::objective::rllh().

8.4.3.20 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.4.3.21 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.4.4 Member Data Documentation

8.4.4.1 template<class Model > int mappel::CGaussMLE< Model >::max_iterations

Definition at line 157 of file estimator.h.

8.4.4.2 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected], [inherited]

Definition at line 127 of file estimator.h.

8.4.4.3 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.4.4.4 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected], [inherited]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.4.4.5 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.4.4.6 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected], [inherited]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.4.4.7 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

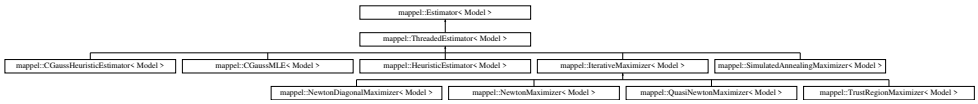
The documentation for this class was generated from the following files:

- estimator.h
- estimator_impl.h

8.5 mappel::Estimator< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::Estimator< Model >:



Public Member Functions

- Estimator (Model &_model)
- virtual ~Estimator ()
- virtual std::string name () const =0
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)
- virtual void estimate_max_stack (const ModelDataStackT< Model > &im_stack, const ParamVecT< Model > &theta_init_stack, ParamVecT< Model > &theta_est_stack, VecT &rllh_stack, CubeT &obsI_stack)=0
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩ stack, VecT &rllh_stack, CubeT &obsI_stack)
- virtual void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_parameters)=0
- virtual StatsT get_stats ()
- virtual StatsT get_debug_stats ()=0
- virtual void clear_stats ()

Protected Member Functions

- virtual StencilT< Model > compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)=0
- virtual StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- virtual void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- Model & model
- int num_estimations = 0
- double total_walltime = 0.

Friends

- template<class T >
  std::ostream & operator<< (std::ostream &out, Estimator< T > &estimator)

8.5.1 Detailed Description

template<class Model>
class mappel::Estimator< Model >

Definition at line 37 of file estimator.h.

8.5.2 Constructor & Destructor Documentation

8.5.2.1 template<class Model > mappel::Estimator< Model >::Estimator (Model & *_model*) [inline]

Definition at line 39 of file estimator.h.

8.5.2.2 template<class Model > virtual mappel::Estimator< Model >::~Estimator ( ) [inline], [virtual]

Definition at line 40 of file estimator.h.

References mappel::Estimator< Model >::clear_stats(), mappel::Estimator< Model >::compute_estimate(), mappel::Estimator< Model >::compute_estimate_debug(), mappel::Estimator< Model >::compute_profile_estimate(), mappel::Estimator< Model >::estimate_max(), mappel::Estimator< Model >::estimate_max_debug(), mappel::Estimator< Model >::estimate_max_stack(), mappel::Estimator< Model >::estimate_profile_stack(), mappel::Estimator< Model >::get_debug_stats(), mappel::Estimator< Model >::get_model(), mappel::Estimator< Model >::get_stats(), mappel::Estimator< Model >::name(), mappel::methods::objective::rllh(), mappel::methods::objective::openmp::rllh_stack(), and mappel::Estimator< Model >::set_model().

8.5.3 Member Function Documentation

8.5.3.1 template<class Model > void mappel::Estimator< Model >::clear_stats ( ) [virtual]

Reimplemented in mappel::IterativeMaximizer< Model >, and mappel::ThreadedEstimator< Model >.

Definition at line 168 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), and mappel::Estimator< Model >::~Estimator().

8.5.3.2 template<class Model > virtual StencilT<Model> mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [protected], [pure virtual]

Implemented in mappel::IterativeMaximizer< Model >, mappel::SimulatedAnnealingMaximizer< Model >, and mappel::CGaussMLE< Model >.

Referenced by mappel::HeuristicEstimator< Model >::name(), mappel::CGaussHeuristicEstimator< Model >::name(), mappel::CGaussMLE< Model >::name(), mappel::SimulatedAnnealingMaximizer< Model >::SimulatedAnnealing↩Maximizer(), and mappel::Estimator< Model >::~Estimator().

8.5.3.3 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI*) [protected], [virtual]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.5.3.4 template<class Model > StencilT< Model > mappel::Estimator< Model >::compute_estimate_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamVecT< Model > & *sequence,* VecT & *sequence_rllh*) [inline], [protected], [virtual]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented in mappel::IterativeMaximizer< Model >, mappel::SimulatedAnnealingMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 192 of file estimator_impl.h.

Referenced by mappel::CGaussMLE< Model >::name(), mappel::SimulatedAnnealingMaximizer< Model >::↩SimulatedAnnealingMaximizer(), and mappel::Estimator< Model >::~Estimator().

8.5.3.5 template<class Model > void mappel::Estimator< Model >::compute_profile_estimate (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, const IdxVecT & *fixed_parameters*, ParamT< Model > & *theta_est*, double & *rllh*) [protected], [virtual]

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 151 of file estimator_impl.h.

References mappel::Estimator< Model >::name().

Referenced by mappel::Estimator< Model >::~Estimator().

8.5.3.6 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*)

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.5.3.7 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*)

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.5.3.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, double & *rllh*)

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.5.3.9 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, double & *rllh*)

Definition at line 85 of file estimator_impl.h.

8.5.3.10 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, ParamT< Model > & *theta*, double & *rllh*, MatT & *obsI*)

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.5.3.11 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamT< Model > & *theta*, double & *rllh*, MatT & *obsI*)

Definition at line 106 of file estimator_impl.h.

8.5.3.12 template<class Model > void mappel::Estimator< Model >::estimate_max_debug (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamT< Model > & *theta_est*, double & *rllh*, MatT & *obsl*, MatT & *sequence*, VecT & *sequence_rllh*)

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.5.3.13 template<class Model > virtual void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack*, const ParamVecT< Model > & *theta_init_stack*, ParamVecT< Model > & *theta_est_stack*, VecT & *rllh_stack*, CubeT & *obsl_stack*) [pure virtual]

Implemented in mappel::ThreadedEstimator< Model >.

Referenced by mappel::Estimator< Model >::~Estimator().

8.5.3.14 template<class Model > void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack*, ParamVecT< Model > & *theta_est_stack*, VecT & *rllh_stack*, CubeT & *obsl_stack*)

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.5.3.15 template<class Model > virtual void mappel::Estimator< Model >::estimate_profile_stack (const ModelDataT< Model > & *data*, const IdxVecT & *fixed_parameters*, const MatT & *values*, const ParamVecT< Model > & *theta_init*, VecT & *profile_likelihood*, ParamVecT< Model > & *profile_parameters*) [pure virtual]

Implemented in mappel::ThreadedEstimator< Model >.

Referenced by mappel::Estimator< Model >::~Estimator().

8.5.3.16 template<class Model > virtual StatsT mappel::Estimator< Model >::get_debug_stats ( ) [pure virtual]

Implemented in mappel::IterativeMaximizer< Model >, mappel::CGaussMLE< Model >, and mappel::ThreadedEstimator< Model >.

Referenced by mappel::CGaussMLE< Model >::CGaussMLE(), and mappel::Estimator< Model >::~Estimator().

8.5.3.17 template<class Model > Model & mappel::Estimator< Model >::get_model ( )

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.5.3.18 template<class Model > StatsT mappel::Estimator< Model >::get_stats ( ) [virtual]

Reimplemented in mappel::IterativeMaximizer< Model >, mappel::CGaussMLE< Model >, and mappel::ThreadedEstimator< Model >.

Definition at line 159 of file estimator_impl.h.

Referenced by mappel::CGaussMLE< Model >::CGaussMLE(), mappel::ThreadedEstimator< Model >::get_stats(), mappel::operator<<(), and mappel::Estimator< Model >::~Estimator().

8.5.3.19 template<class Model > virtual std::string mappel::Estimator< Model >::name ( ) const [pure virtual]

Implemented in mappel::TrustRegionMaximizer< Model >, mappel::QuasiNewtonMaximizer< Model >, mappel::NewtonMaximizer< Model >, mappel::NewtonDiagonalMaximizer< Model >, mappel::SimulatedAnnealingMaximizer< Model >, mappel::CGaussMLE< Model >, mappel::CGaussHeuristicEstimator< Model >, and mappel::HeuristicEstimator< Model >.

Referenced by mappel::Estimator< Model >::compute_profile_estimate(), and mappel::Estimator< Model >::~Estimator().

8.5.3.20 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.5.3.21 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*)

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.5.4 Friends And Related Function Documentation

8.5.4.1 template<class Model > template<class T > std::ostream& operator<< (std::ostream & *out,* Estimator< T > & *estimator*) [friend]

8.5.5 Member Data Documentation

8.5.5.1 template<class Model > Model& mappel::Estimator< Model >::model [protected]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.5.5.2 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_↩ stats().

8.5.5.3 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

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

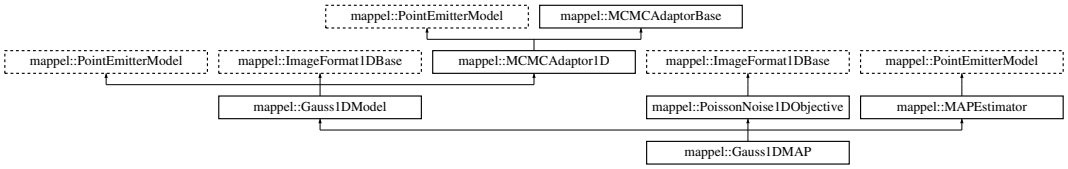
- estimator.h
- estimator_impl.h

8.6 mappel::Gauss1DMAP Class Reference

A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss1DMAP.h>`

Inheritance diagram for mappel::Gauss1DMAP:



Public Types

- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = CoordT
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Col< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Col< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Mat< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >
- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT

Public Member Functions

- Gauss1DMAP (arma::Col< ImageCoordT > size, VecT psf_sigma, const std::string &prior_type=DefaultPrior↩ Type)
- Gauss1DMAP (ImageSizeT size, double psf_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss1DMAP (ImageSizeT size, double psf_sigma, CompositeDist &&prior)
- Gauss1DMAP (ImageSizeT size, double psf_sigma, const CompositeDist &prior)
- Gauss1DMAP (const Gauss1DMAP &o)
- Gauss1DMAP & operator= (const Gauss1DMAP &o)
- Gauss1DMAP (Gauss1DMAP &&o)
- Gauss1DMAP & operator= (Gauss1DMAP &&o)
- double get_psf_sigma () const
- double get_psf_sigma (IdxT idx) const
- void set_psf_sigma (double new_psf_sigma)
- void set_psf_sigma (const VecT &new_psf_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (IdxT i, const Stencil &s) const
- void pixel_grad (IdxT i, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (IdxT i, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (IdxT i, const Stencil &s, MatT &hess) const
- void pixel_hess_update (IdxT i, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im) const

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init) const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)

- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- ImageSizeT get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void set_size (const arma::Col< ImageCoordT > &sz)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (IdxT size, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (IdxT size)
- static CompositeDist make_default_prior_normal_position (IdxT size)
- static CompositeDist make_prior_beta_position (IdxT size, double beta_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static CompositeDist make_prior_normal_position (IdxT size, double sigma_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string name
- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim = 1
- static const ImageCoordT global_min_size = 3
- static const ImageCoordT global_max_size = 512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5
- static const std::vector< std::string > estimator_names

Protected Member Functions

- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- double psf_sigma
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.6.1 Detailed Description

A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.

Model: Gauss1DModel - 1D Gaussian PSF with fixed PSF sigma Objective: PoissonNoise1DObjective - Poisson noise model for 1D Estimator: MAPstimator - Maximum a-posteriori estimator

Definition at line 23 of file Gauss1DMAP.h.

8.6.2 Member Typedef Documentation

8.6.2.1 using mappel::ImageFormat1DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 25 of file ImageFormat1DBase.h.

8.6.2.2 using mappel::ImageFormat1DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 26 of file ImageFormat1DBase.h.

8.6.2.3 template<class PixelT > using mappel::ImageFormat1DBase::ImageShapeT = arma::Col<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 33 of file ImageFormat1DBase.h.

8.6.2.4 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeShapeT = CoordT [inherited]

Shape of the data type to store 1-image's coordinates

Definition at line 28 of file ImageFormat1DBase.h.

8.6.2.5 using mappel::ImageFormat1DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 30 of file ImageFormat1DBase.h.

8.6.2.6 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeVecShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 29 of file ImageFormat1DBase.h.

8.6.2.7 using mappel::ImageFormat1DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 31 of file ImageFormat1DBase.h.

8.6.2.8 template<class PixelT > using mappel::ImageFormat1DBase::ImageStackShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 34 of file ImageFormat1DBase.h.

8.6.2.9 using mappel::ImageFormat1DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 36 of file ImageFormat1DBase.h.

8.6.2.10 using mappel::ImageFormat1DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 35 of file ImageFormat1DBase.h.

8.6.2.11 using mappel::PoissonNoise1DObjective::ModelDataStackT = ImageStackT [inherited]

Objective function data stack type: 1D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 26 of file PoissonNoise1DObjective.h.

8.6.2.12 using mappel::PoissonNoise1DObjective::ModelDataT = ImageT [inherited]

Objective function data type: 1D double precision image, gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise1DObjective.h.

8.6.2.13 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.6.2.14 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.6.2.15 using mappel::Gauss1DModel::StencilVecT = std::vector<Stencil> [inherited]

Definition at line 49 of file Gauss1DModel.h.

8.6.3 Constructor & Destructor Documentation

8.6.3.1 mappel::Gauss1DMAP::Gauss1DMAP (arma::Col< ImageCoordT > *size*, VecT *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 11 of file Gauss1DMAP.cpp.

8.6.3.2 mappel::Gauss1DMAP::Gauss1DMAP (ImageSizeT *size*, double *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 15 of file Gauss1DMAP.cpp.

8.6.3.3 mappel::Gauss1DMAP::Gauss1DMAP (ImageSizeT *size*, double *psf_sigma*, CompositeDist && *prior*)

Definition at line 19 of file Gauss1DMAP.cpp.

8.6.3.4 mappel::Gauss1DMAP::Gauss1DMAP (ImageSizeT *size,* double *psf_sigma,* const CompositeDist & *prior*)

Definition at line 27 of file Gauss1DMAP.cpp.

8.6.3.5 mappel::Gauss1DMAP::Gauss1DMAP (const Gauss1DMAP & *o*)

Definition at line 35 of file Gauss1DMAP.cpp.

8.6.3.6 mappel::Gauss1DMAP::Gauss1DMAP (Gauss1DMAP && *o*)

Definition at line 43 of file Gauss1DMAP.cpp.

8.6.4 Member Function Documentation

8.6.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.6.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.6.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.6.4.4 void ImageFormat1DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 59 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.6.4.5 void ImageFormat1DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 71 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.6.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.6.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.6.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.6.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.6.4.10 void ImageFormat1DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 39 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::global_max_size, and mappel::ImageFormat1DBase::global_min_size.

Referenced by mappel::ImageFormat1DBase::ImageFormat1DBase(), and mappel::ImageFormat1DBase::set_size().

8.6.4.11 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.12 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.13 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.6.4.14 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.15 ImageFormat1DBase::ImageT ImageFormat1DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 108 of file ImageFormat1DBase.h.

8.6.4.16 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.6.4.17 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.6.4.18 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.6.4.19 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.6.4.20 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.6.4.21 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 82 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.6.4.22 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.23 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.6.4.24 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.25 double mappel::Gauss1DModel::get_psf_sigma ( ) const [inline], [inherited]

Definition at line 127 of file Gauss1DModel.h.

References mappel::Gauss1DModel::psf_sigma.

Referenced by mappel::Gauss1DModel::get_stats().

8.6.4.26 double mappel::Gauss1DModel::get_psf_sigma (IdxT *idx*) const [inherited]

Definition at line 131 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::psf_sigma.

8.6.4.27 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.6.4.28 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.6.4.29 ImageFormat1DBase::ImageSizeT ImageFormat1DBase::get_size ( ) const [inline], [inherited]

Definition at line 71 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.6.4.30 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 20 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.6.4.31 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 101 of file ImageFormat1DBase.h.

8.6.4.32 StatsT mappel::Gauss1DModel::get_stats ( ) const [inherited]

Definition at line 178 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::get_psf_sigma(), mappel::MCMCAdaptor1D::get_stats(), mappel::ImageFormat1DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.6.4.33 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMC↩Adaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.6.4.34 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.35 Gauss1DModel::Stencil mappel::Gauss1DModel::initial_theta_estimate (const ImageT & *im*) const [inline], [inherited]

Fast, heuristic estimate of initial theta.

Definition at line 169 of file Gauss1DModel.h.

References mappel::PointEmitterModel::make_param(), and mappel::Gauss1DModel::Stencil::theta.

8.6.4.36 Gauss1DModel::Stencil mappel::Gauss1DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) const [inherited]

Definition at line 207 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::Stencil::bg(), mappel::Gauss1DModel::Stencil::I(), mappel::Gauss1DModel↩::make_stencil(), mappel::PointEmitterModel::num_params, and mappel::ImageFormat1DBase::size.

8.6.4.37 CompositeDist mappel::Gauss1DModel::make_default_prior (IdxT *size,* const std::string & *prior_type*) [static], [inherited]

Definition at line 59 of file Gauss1DModel.cpp.

References mappel::istarts_with(), mappel::Gauss1DModel::make_default_prior_beta_position(), and mappel::↩Gauss1DModel::make_default_prior_normal_position().

8.6.4.38 CompositeDist mappel::Gauss1DModel::make_default_prior_beta_position (IdxT *size*) [static], [inherited]

Definition at line 80 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩_intensity(), and mappel::PointEmitterModel::make_prior_component_position_beta().

Referenced by mappel::Gauss1DModel::make_default_prior().

8.6.4.39 CompositeDist mappel::Gauss1DModel::make_default_prior_normal_position (IdxT *size*) [static], [inherited]

Definition at line 90 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_prior_component_position_normal().

Referenced by mappel::Gauss1DModel::make_default_prior().

8.6.4.40 ImageFormat1DBase::ImageT ImageFormat1DBase::make_image ( ) const [inline], [inherited]

Definition at line 87 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.6.4.41 ImageFormat1DBase::ImageStackT ImageFormat1DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 94 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.6.4.42 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.6.4.43 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.6.4.44 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.6.4.45 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.6.4.46 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.6.4.47 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.6.4.48 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta↩_stack().

8.6.4.49 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.6.4.50 CompositeDist mappel::Gauss1DModel::make_prior_beta_position (IdxT *size,* double *beta_xpos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static], [inherited]

Definition at line 101 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_↩prior_component_position_beta().

Referenced by mappel::Gauss2DModel::make_internal_1Dsum_estimator().

8.6.4.51 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = **default_mean_I**, double *kappa* = **default_intensity_kappa**) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.6.4.52 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size*, double *pos_beta* = **default_beta_pos**) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.6.4.53 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size*, double *pos_sigma* = **default_sigma_pos**) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.6.4.54 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma*, double *max_sigma*, double *alpha* = **default_alpha_sigma**) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.6.4.55 CompositeDist mappel::Gauss1DModel::make_prior_normal_position (IdxT *size,* double *sigma_xpos,* double *mean_l,* double *kappa_l,* double *mean_bg,* double *kappa_bg*) [static],[inherited]

Definition at line 114 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_↩ prior_component_position_normal().

Referenced by mappel::Gauss2DModel::make_internal_1Dsum_estimator().

8.6.4.56 Gauss1DModel::Stencil mappel::Gauss1DModel::make_stencil (const ParamT & *theta,* bool *compute_derivatives* = true) const [inline],[inherited]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 116 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by mappel::Gauss1DModel::initial_theta_estimate().

8.6.4.57 Gauss1DMAP & mappel::Gauss1DMAP::operator= (const Gauss1DMAP & *o*)

Definition at line 51 of file Gauss1DMAP.cpp.

References mappel::MAPEstimator::operator=(), mappel::PoissonNoise1DObjective::operator=(), mappel::Gauss1D↩ Model::operator=(), and mappel::PointEmitterModel::operator=().

8.6.4.58 Gauss1DMAP & mappel::Gauss1DMAP::operator= (Gauss1DMAP && *o*)

Definition at line 62 of file Gauss1DMAP.cpp.

References mappel::MAPEstimator::operator=(), mappel::PoissonNoise1DObjective::operator=(), mappel::Gauss1D↩Model::operator=(), and mappel::PointEmitterModel::operator=().

8.6.4.59 void mappel::Gauss1DModel::pixel_grad (IdxT *i,* const Stencil & *s,* ParamT & *pgrad*) const [inline], [inherited]

Definition at line 141 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DX, mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel↩::Stencil::X.

Referenced by mappel::Gauss1DModel::pixel_hess_update().

8.6.4.60 void mappel::Gauss1DModel::pixel_grad2 (IdxT *i,* const Stencil & *s,* ParamT & *pgrad2*) const [inline], [inherited]

Definition at line 150 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1D↩Model::psf_sigma.

8.6.4.61 void mappel::Gauss1DModel::pixel_hess (IdxT *i,* const Stencil & *s,* MatT & *hess*) const [inline], [inherited]

Definition at line 159 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DX, mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::↩Stencil::I(), and mappel::Gauss1DModel::psf_sigma.

8.6.4.62 void mappel::Gauss1DModel::pixel_hess_update (IdxT *i,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const [inherited]

pixel derivative inner loop calculations.

Definition at line 191 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::I(), mappel::PointEmitterModel↩::make_param(), mappel::Gauss1DModel::pixel_grad(), and mappel::Gauss1DModel::psf_sigma.

8.6.4.63 double mappel::Gauss1DModel::pixel_model_value (IdxT *i,* const Stencil & *s*) const [inline], [inherited]

Definition at line 135 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::bg(), mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel↩::Stencil::X.

8.6.4.64 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.6.4.65 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.6.4.66 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.67 void mappel::MCMCAdaptor1D::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 108 of file MCMCAdaptor1D.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.6.4.68 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.69 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.6.4.70 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = −1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.6.4.71 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.6.4.72 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.73 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.74 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.6.4.75 template<class ImT > void ImageFormat1DBase::set_image_in_stack (ImageStackT & *stack*, ImageCoordT *n*, const ImT & *im*) const [inherited]

Definition at line 115 of file ImageFormat1DBase.h.

8.6.4.76 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = −1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩ Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.6.4.77 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.6.4.78 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩ Ds().

8.6.4.79 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩ _scale.

8.6.4.80 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.6.4.81 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.6.4.82 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.6.4.83 void mappel::Gauss1DModel::set_psf_sigma (double *new_psf_sigma*) [inherited]

Definition at line 125 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), and mappel::Gauss1DModel::psf_sigma.

Referenced by mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.6.4.84 void mappel::Gauss1DModel::set_psf_sigma (const **VecT** & *new_psf_sigma*) [inline], [inherited]

Definition at line 131 of file Gauss1DModel.h.

References mappel::Gauss1DModel::set_psf_sigma().

8.6.4.85 void mappel::PointEmitterModel::set_rng_seed (**RngSeedT** *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.6.4.86 void ImageFormat1DBase::set_size (const **ImageSizeT** & *size_*) [inherited]

Definition at line 30 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::check_size(), and mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::set_size(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DsModel::set_size().

8.6.4.87 void ImageFormat1DBase::set_size (const arma::Col< **ImageCoordT** > & *sz*) [inline], [inherited]

Definition at line 75 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::set_size().

8.6.4.88 void mappel::PointEmitterModel::set_ubound (const **ParamT** & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.6.4.89 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.6.4.90 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.6.5 Member Data Documentation

8.6.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.6.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.6.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.6.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.6.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.6.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.6.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.6.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.6.5.9 const std::string mappel::Gauss1DModel::DefaultPriorType = "Normal" [static], [inherited]

Definition at line 53 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::operator=().

8.6.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.6.5.11 const std::vector< std::string > mappel::PoissonNoise1DObjective::estimator_names [static], [inherited]

Definition at line 24 of file PoissonNoise1DObjective.h.

8.6.5.12 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.6.5.13 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.6.5.14 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.6.5.15 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.6.5.16 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.6.5.17 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static],[inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.6.5.18 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_max_size = 512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 40 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.6.5.19 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static],[inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.6.5.20 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_min_size = 3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 39 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.6.5.21 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.6.5.22 const std::string mappel::Gauss1DMAP::name [static]

Definition at line 34 of file Gauss1DMAP.h.

8.6.5.23 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::num_dim = 1 [static], [inherited]

Number of image dimensions.

Definition at line 38 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.6.5.24 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.6.5.25 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.6.5.26 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.6.5.27 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.6.5.28 const StringVecT mappel::Gauss1DModel::prior_types [static], [inherited]

Initial value:

```
= { "Beta",
                                                    "Normal"
                                                  }
```

Definition at line 52 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::operator=().

8.6.5.29 double mappel::Gauss1DModel::psf_sigma [protected], [inherited]

Standard deviation of the fixed-sigma 1D Gaussian PSF in pixels

Definition at line 90 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::Gauss1DModel::get_psf_sigma(), mappel::Gauss1DModel::operator=(), mappel::Gauss1DModel::pixel_grad2(), mappel::Gauss1DModel::pixel_hess(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss1D↩ Model::Stencil::Stencil().

8.6.5.30 double mappel::MCMCAdaptorBase::sigma_scale [protected], [inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMC↩ Adaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set↩ _background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMC↩ AdaptorBase::set_mcmc_sigma_scale().

8.6.5.31 ImageSizeT mappel::ImageFormat1DBase::size [protected], [inherited]

Number of pixels in X dimension for 1D image

Definition at line 65 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_image_shape(), mappel::Gauss1DsModel::Stencil::compute↩ _derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::ImageFormat1DBase::get_num↩ _pixels(), mappel::ImageFormat1DBase::get_size(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::↩ Gauss1DsModel::initial_theta_estimate(), mappel::ImageFormat1DBase::make_image(), mappel::ImageFormat1↩ DBase::make_image_stack(), mappel::ImageFormat1DBase::set_size(), mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::Gauss1DModel::Stencil::Stencil().

8.6.5.32 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

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

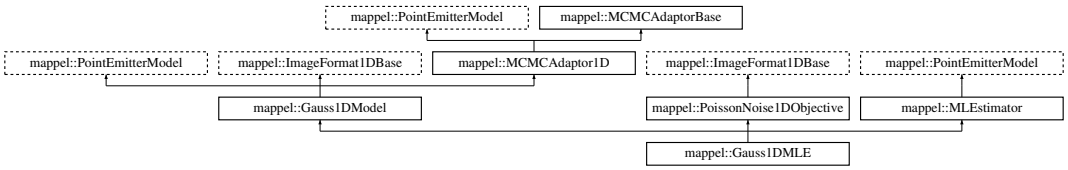
- Gauss1DMAP.h
- Gauss1DMAP.cpp

8.7 mappel::Gauss1DMLE Class Reference

A 1D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss1DMLE.h>`

Inheritance diagram for mappel::Gauss1DMLE:



Public Types

- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = CoordT
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Col< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Col< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Mat< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >
- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT

Public Member Functions

- Gauss1DMLE (arma::Col< ImageCoordT > size, VecT psf_sigma, const std::string &prior_type=DefaultPrior↩ Type)
- Gauss1DMLE (ImageSizeT size, double psf_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss1DMLE (ImageSizeT size, double psf_sigma, CompositeDist &&prior)
- Gauss1DMLE (ImageSizeT size, double psf_sigma, const CompositeDist &prior)
- Gauss1DMLE (const Gauss1DMLE &o)
- Gauss1DMLE & operator= (const Gauss1DMLE &o)
- Gauss1DMLE (Gauss1DMLE &&o)
- Gauss1DMLE & operator= (Gauss1DMLE &&o)
- double get_psf_sigma () const
- double get_psf_sigma (IdxT idx) const
- void set_psf_sigma (double new_psf_sigma)
- void set_psf_sigma (const VecT &new_psf_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (IdxT i, const Stencil &s) const
- void pixel_grad (IdxT i, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (IdxT i, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (IdxT i, const Stencil &s, MatT &hess) const
- void pixel_hess_update (IdxT i, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im) const

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init) const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)

- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- ImageSizeT get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void set_size (const arma::Col< ImageCoordT > &sz)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (IdxT size, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (IdxT size)
- static CompositeDist make_default_prior_normal_position (IdxT size)
- static CompositeDist make_prior_beta_position (IdxT size, double beta_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static CompositeDist make_prior_normal_position (IdxT size, double sigma_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string name
- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim = 1
- static const ImageCoordT global_min_size = 3
- static const ImageCoordT global_max_size = 512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5
- static const std::vector< std::string > estimator_names

Protected Member Functions

- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- double psf_sigma
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.7.1 Detailed Description

A 1D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective.

Model: Gauss1DModel - 1D Gaussian PSF with fixed PSF sigma Objective: PoissonNoise1DObjective - Poisson noise model for 1D Estimator: MLEstimator - Pure-likelihood estimator

Definition at line 23 of file Gauss1DMLE.h.

8.7.2 Member Typedef Documentation

8.7.2.1 using mappel::ImageFormat1DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 25 of file ImageFormat1DBase.h.

8.7.2.2 using mappel::ImageFormat1DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 26 of file ImageFormat1DBase.h.

8.7.2.3 template<class PixelT > using mappel::ImageFormat1DBase::ImageShapeT = arma::Col<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 33 of file ImageFormat1DBase.h.

8.7.2.4 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeShapeT = CoordT [inherited]

Shape of the data type to store 1-image's coordinates

Definition at line 28 of file ImageFormat1DBase.h.

8.7.2.5 using mappel::ImageFormat1DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 30 of file ImageFormat1DBase.h.

8.7.2.6 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeVecShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 29 of file ImageFormat1DBase.h.

8.7.2.7 using mappel::ImageFormat1DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 31 of file ImageFormat1DBase.h.

8.7.2.8 template<class PixelT > using mappel::ImageFormat1DBase::ImageStackShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 34 of file ImageFormat1DBase.h.

8.7.2.9 using mappel::ImageFormat1DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 36 of file ImageFormat1DBase.h.

8.7.2.10 using mappel::ImageFormat1DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 35 of file ImageFormat1DBase.h.

8.7.2.11 using mappel::PoissonNoise1DObjective::ModelDataStackT = ImageStackT [inherited]

Objective function data stack type: 1D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 26 of file PoissonNoise1DObjective.h.

8.7.2.12 using mappel::PoissonNoise1DObjective::ModelDataT = ImageT [inherited]

Objective function data type: 1D double precision image, gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise1DObjective.h.

8.7.2.13 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.7.2.14 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.7.2.15 using mappel::Gauss1DModel::StencilVecT = std::vector<Stencil> [inherited]

Definition at line 49 of file Gauss1DModel.h.

8.7.3 Constructor & Destructor Documentation

8.7.3.1 mappel::Gauss1DMLE::Gauss1DMLE (arma::Col< ImageCoordT > *size*, VecT *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 11 of file Gauss1DMLE.cpp.

8.7.3.2 mappel::Gauss1DMLE::Gauss1DMLE (ImageSizeT *size*, double *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 15 of file Gauss1DMLE.cpp.

8.7.3.3 mappel::Gauss1DMLE::Gauss1DMLE (ImageSizeT *size*, double *psf_sigma*, CompositeDist && *prior*)

Definition at line 19 of file Gauss1DMLE.cpp.

8.7.3.4 mappel::Gauss1DMLE::Gauss1DMLE (ImageSizeT *size,* double *psf_sigma,* const CompositeDist & *prior*)

Definition at line 27 of file Gauss1DMLE.cpp.

8.7.3.5 mappel::Gauss1DMLE::Gauss1DMLE (const Gauss1DMLE & *o*)

Definition at line 35 of file Gauss1DMLE.cpp.

8.7.3.6 mappel::Gauss1DMLE::Gauss1DMLE (Gauss1DMLE && *o*)

Definition at line 43 of file Gauss1DMLE.cpp.

8.7.4 Member Function Documentation

8.7.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.7.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.7.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.7.4.4 void ImageFormat1DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 59 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.7.4.5 void ImageFormat1DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 71 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.7.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.7.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.7.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.7.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.7.4.10 void ImageFormat1DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 39 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::global_max_size, and mappel::ImageFormat1DBase::global_min_size.

Referenced by mappel::ImageFormat1DBase::ImageFormat1DBase(), and mappel::ImageFormat1DBase::set_size().

8.7.4.11 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.12 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.13 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.7.4.14 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.15 ImageFormat1DBase::ImageT ImageFormat1DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 108 of file ImageFormat1DBase.h.

8.7.4.16 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.7.4.17 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.7.4.18 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.7.4.19 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.7.4.20 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.7.4.21 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 82 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.7.4.22 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.23 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.7.4.24 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.25 double mappel::Gauss1DModel::get_psf_sigma ( ) const [inline], [inherited]

Definition at line 127 of file Gauss1DModel.h.

References mappel::Gauss1DModel::psf_sigma.

Referenced by mappel::Gauss1DModel::get_stats().

8.7.4.26 double mappel::Gauss1DModel::get_psf_sigma (IdxT *idx*) const [inherited]

Definition at line 131 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::psf_sigma.

8.7.4.27 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.7.4.28 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.7.4.29 ImageFormat1DBase::ImageSizeT ImageFormat1DBase::get_size ( ) const [inline], [inherited]

Definition at line 71 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.7.4.30 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 20 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.7.4.31 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 101 of file ImageFormat1DBase.h.

8.7.4.32 StatsT mappel::Gauss1DModel::get_stats ( ) const [inherited]

Definition at line 178 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::get_psf_sigma(), mappel::MCMCAdaptor1D::get_stats(), mappel::ImageFormat1DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.7.4.33 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMC↩Adaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.7.4.34 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.35 Gauss1DModel::Stencil mappel::Gauss1DModel::initial_theta_estimate (const ImageT & *im*) const [inline], [inherited]

Fast, heuristic estimate of initial theta.

Definition at line 169 of file Gauss1DModel.h.

References mappel::PointEmitterModel::make_param(), and mappel::Gauss1DModel::Stencil::theta.

8.7.4.36 Gauss1DModel::Stencil mappel::Gauss1DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) const [inherited]

Definition at line 207 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::Stencil::bg(), mappel::Gauss1DModel::Stencil::I(), mappel::Gauss1DModel↩::make_stencil(), mappel::PointEmitterModel::num_params, and mappel::ImageFormat1DBase::size.

8.7.4.37 CompositeDist mappel::Gauss1DModel::make_default_prior (IdxT *size,* const std::string & *prior_type*) [static], [inherited]

Definition at line 59 of file Gauss1DModel.cpp.

References mappel::istarts_with(), mappel::Gauss1DModel::make_default_prior_beta_position(), and mappel::↩Gauss1DModel::make_default_prior_normal_position().

8.7.4.38 CompositeDist mappel::Gauss1DModel::make_default_prior_beta_position (IdxT *size*) [static], [inherited]

Definition at line 80 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩_intensity(), and mappel::PointEmitterModel::make_prior_component_position_beta().

Referenced by mappel::Gauss1DModel::make_default_prior().

8.7.4.39 CompositeDist mappel::Gauss1DModel::make_default_prior_normal_position (IdxT *size*) [static], [inherited]

Definition at line 90 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_prior_component_position_normal().

Referenced by mappel::Gauss1DModel::make_default_prior().

8.7.4.40 ImageFormat1DBase::ImageT ImageFormat1DBase::make_image ( ) const [inline], [inherited]

Definition at line 87 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.7.4.41 ImageFormat1DBase::ImageStackT ImageFormat1DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 94 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.7.4.42 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.7.4.43 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.7.4.44 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.7.4.45 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.7.4.46 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.7.4.47 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.7.4.48 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta↩_stack().

8.7.4.49 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.7.4.50 CompositeDist mappel::Gauss1DModel::make_prior_beta_position (IdxT *size,* double *beta_xpos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static], [inherited]

Definition at line 101 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_↩prior_component_position_beta().

Referenced by mappel::Gauss2DModel::make_internal_1Dsum_estimator().

8.7.4.51 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.7.4.52 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size*, double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.7.4.53 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size*, double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.7.4.54 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma*, double *max_sigma*, double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.7.4.55 CompositeDist mappel::Gauss1DModel::make_prior_normal_position (IdxT *size,* double *sigma_xpos,* double *mean_l,* double *kappa_l,* double *mean_bg,* double *kappa_bg*) [static],[inherited]

Definition at line 114 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_↩ prior_component_position_normal().

Referenced by mappel::Gauss2DModel::make_internal_1Dsum_estimator().

8.7.4.56 Gauss1DModel::Stencil mappel::Gauss1DModel::make_stencil (const ParamT & *theta,* bool *compute_derivatives* = true) const [inline],[inherited]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 116 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by mappel::Gauss1DModel::initial_theta_estimate().

8.7.4.57 Gauss1DMLE & mappel::Gauss1DMLE::operator= (const Gauss1DMLE & *o*)

Definition at line 51 of file Gauss1DMLE.cpp.

References mappel::MLEstimator::operator=(), mappel::PoissonNoise1DObjective::operator=(), mappel::Gauss1D↩ Model::operator=(), and mappel::PointEmitterModel::operator=().

8.7.4.58 Gauss1DMLE & mappel::Gauss1DMLE::operator= (Gauss1DMLE && *o*)

Definition at line 62 of file Gauss1DMLE.cpp.

References mappel::MLEstimator::operator=(), mappel::PoissonNoise1DObjective::operator=(), mappel::Gauss1D↩Model::operator=(), and mappel::PointEmitterModel::operator=().

8.7.4.59 void mappel::Gauss1DModel::pixel_grad (IdxT *i,* const Stencil & *s,* ParamT & *pgrad*) const [inline], [inherited]

Definition at line 141 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DX, mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel↩::Stencil::X.

Referenced by mappel::Gauss1DModel::pixel_hess_update().

8.7.4.60 void mappel::Gauss1DModel::pixel_grad2 (IdxT *i,* const Stencil & *s,* ParamT & *pgrad2*) const [inline], [inherited]

Definition at line 150 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1D↩Model::psf_sigma.

8.7.4.61 void mappel::Gauss1DModel::pixel_hess (IdxT *i,* const Stencil & *s,* MatT & *hess*) const [inline], [inherited]

Definition at line 159 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DX, mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::↩Stencil::I(), and mappel::Gauss1DModel::psf_sigma.

8.7.4.62 void mappel::Gauss1DModel::pixel_hess_update (IdxT *i,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const [inherited]

pixel derivative inner loop calculations.

Definition at line 191 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::I(), mappel::PointEmitterModel↩::make_param(), mappel::Gauss1DModel::pixel_grad(), and mappel::Gauss1DModel::psf_sigma.

8.7.4.63 double mappel::Gauss1DModel::pixel_model_value (IdxT *i,* const Stencil & *s*) const [inline], [inherited]

Definition at line 135 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::bg(), mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel↩::Stencil::X.

8.7.4.64 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.7.4.65 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.7.4.66 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.67 void mappel::MCMCAdaptor1D::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 108 of file MCMCAdaptor1D.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.7.4.68 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.69 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.7.4.70 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = −1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.7.4.71 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.7.4.72 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.73 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.74 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.7.4.75 template<class ImT > void ImageFormat1DBase::set_image_in_stack (ImageStackT & *stack*, ImageCoordT *n*, const ImT & *im*) const [inherited]

Definition at line 115 of file ImageFormat1DBase.h.

8.7.4.76 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = −1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩ Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.7.4.77 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.7.4.78 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩ Ds().

8.7.4.79 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩ _scale.

8.7.4.80 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.7.4.81 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.7.4.82 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.7.4.83 void mappel::Gauss1DModel::set_psf_sigma (double *new_psf_sigma*) [inherited]

Definition at line 125 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), and mappel::Gauss1DModel::psf_sigma.

Referenced by mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.7.4.84 void mappel::Gauss1DModel::set_psf_sigma (const **VecT** & *new_psf_sigma*) [inline], [inherited]

Definition at line 131 of file Gauss1DModel.h.

References mappel::Gauss1DModel::set_psf_sigma().

8.7.4.85 void mappel::PointEmitterModel::set_rng_seed (**RngSeedT** *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.7.4.86 void ImageFormat1DBase::set_size (const **ImageSizeT** & *size_*) [inherited]

Definition at line 30 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::check_size(), and mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::set_size(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DsModel::set_size().

8.7.4.87 void ImageFormat1DBase::set_size (const arma::Col< **ImageCoordT** > & *sz*) [inline], [inherited]

Definition at line 75 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::set_size().

8.7.4.88 void mappel::PointEmitterModel::set_ubound (const **ParamT** & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.7.4.89 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.7.4.90 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.7.5 Member Data Documentation

8.7.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.7.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.7.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.7.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.7.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.7.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.7.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.7.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.7.5.9 const std::string mappel::Gauss1DModel::DefaultPriorType = "Normal" [static], [inherited]

Definition at line 53 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::operator=().

8.7.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.7.5.11 const std::vector< std::string > mappel::PoissonNoise1DObjective::estimator_names [static], [inherited]

Definition at line 24 of file PoissonNoise1DObjective.h.

8.7.5.12 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.7.5.13 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.7.5.14 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.7.5.15 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.7.5.16 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.7.5.17 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static],[inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.7.5.18 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_max_size = 512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 40 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.7.5.19 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static],[inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.7.5.20 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_min_size = 3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 39 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.7.5.21 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.7.5.22 const std::string mappel::Gauss1DMLE::name [static]

Definition at line 34 of file Gauss1DMLE.h.

8.7.5.23 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::num_dim = 1 [static], [inherited]

Number of image dimensions.

Definition at line 38 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.7.5.24 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.7.5.25 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.7.5.26 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.7.5.27 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.7.5.28 const StringVecT mappel::Gauss1DModel::prior_types [static], [inherited]

Initial value:

```
= { "Beta",
                                                    "Normal"
                                                  }
```

Definition at line 52 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::operator=().

8.7.5.29 double mappel::Gauss1DModel::psf_sigma [protected], [inherited]

Standard deviation of the fixed-sigma 1D Gaussian PSF in pixels

Definition at line 90 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::Gauss1DModel::get_psf_sigma(), mappel::Gauss1DModel::operator=(), mappel::Gauss1DModel::pixel_grad2(), mappel::Gauss1DModel::pixel_hess(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss1D↩ Model::Stencil::Stencil().

8.7.5.30 double mappel::MCMCAdaptorBase::sigma_scale [protected], [inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMC↩ Adaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set↩ _background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMC↩ AdaptorBase::set_mcmc_sigma_scale().

8.7.5.31 ImageSizeT mappel::ImageFormat1DBase::size [protected], [inherited]

Number of pixels in X dimension for 1D image

Definition at line 65 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_image_shape(), mappel::Gauss1DsModel::Stencil::compute↩ _derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::ImageFormat1DBase::get_num↩ _pixels(), mappel::ImageFormat1DBase::get_size(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::↩ Gauss1DsModel::initial_theta_estimate(), mappel::ImageFormat1DBase::make_image(), mappel::ImageFormat1↩ DBase::make_image_stack(), mappel::ImageFormat1DBase::set_size(), mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::Gauss1DModel::Stencil::Stencil().

8.7.5.32 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

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

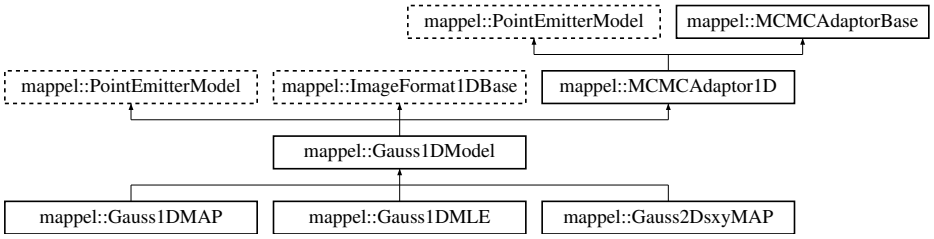
- Gauss1DMLE.h
- Gauss1DMLE.cpp

8.8 mappel::Gauss1DModel Class Reference

A base class for 1D Gaussian PSF with a fixed sigma (standard dev.)

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss1DModel.h>`

Inheritance diagram for mappel::Gauss1DModel:



Classes

- class Stencil

  Stencil for 1D fixed-sigma models.

Public Types

- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = CoordT
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Col< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Col< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Mat< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >

Public Member Functions

- double get_psf_sigma () const
- double get_psf_sigma (IdxT idx) const
- void set_psf_sigma (double new_psf_sigma)
- void set_psf_sigma (const VecT &new_psf_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (IdxT i, const Stencil &s) const
- void pixel_grad (IdxT i, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (IdxT i, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (IdxT i, const Stencil &s, MatT &hess) const
- void pixel_hess_update (IdxT i, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im) const

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init) const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const

- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- ImageSizeT get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void set_size (const arma::Col< ImageCoordT > &sz)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

Check the shape of a stack of images is correct for model size.

- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (IdxT size, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (IdxT size)
- static CompositeDist make_default_prior_normal_position (IdxT size)
- static CompositeDist make_prior_beta_position (IdxT size, double beta_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static CompositeDist make_prior_normal_position (IdxT size, double sigma_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim = 1
- static const ImageCoordT global_min_size = 3
- static const ImageCoordT global_max_size = 512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5

Protected Member Functions

- Gauss1DModel (IdxT size, double psf_sigma)
- Gauss1DModel (const Gauss1DModel &o)
- Gauss1DModel (Gauss1DModel &&o)
- Gauss1DModel & operator= (const Gauss1DModel &o)
- Gauss1DModel & operator= (Gauss1DModel &&o)
- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- double psf_sigma
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_x =0
- double eta_l =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.8.1 Detailed Description

A base class for 1D Gaussian PSF with a fixed sigma (standard dev.)

This base class defines the Stencil type for 1D Gaussian PSF as well as the prior shape and parameters.

Initialized by an integer, size, and double, psf_sigma.

Definition at line 24 of file Gauss1DModel.h.

8.8.2 Member Typedef Documentation

8.8.2.1 using mappel::ImageFormat1DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 25 of file ImageFormat1DBase.h.

8.8.2.2 using mappel::ImageFormat1DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 26 of file ImageFormat1DBase.h.

8.8.2.3 template<class PixelT > using mappel::ImageFormat1DBase::ImageShapeT = arma::Col<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 33 of file ImageFormat1DBase.h.

8.8.2.4 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeShapeT = CoordT [inherited]

Shape of the data type to store 1-image's coordinates

Definition at line 28 of file ImageFormat1DBase.h.

8.8.2.5 using mappel::ImageFormat1DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 30 of file ImageFormat1DBase.h.

8.8.2.6 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeVecShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 29 of file ImageFormat1DBase.h.

8.8.2.7 using mappel::ImageFormat1DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 31 of file ImageFormat1DBase.h.

8.8.2.8 template<class PixelT > using mappel::ImageFormat1DBase::ImageStackShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 34 of file ImageFormat1DBase.h.

8.8.2.9 using mappel::ImageFormat1DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 36 of file ImageFormat1DBase.h.

8.8.2.10 using mappel::ImageFormat1DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 35 of file ImageFormat1DBase.h.

8.8.2.11 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.8.2.12 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.8.2.13 using mappel::Gauss1DModel::StencilVecT = std::vector<Stencil>

Definition at line 49 of file Gauss1DModel.h.

8.8.3 Constructor & Destructor Documentation

8.8.3.1 mappel::Gauss1DModel::Gauss1DModel (IdxT *size,* double *psf_sigma*) [protected]

Definition at line 12 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma().

8.8.3.2 mappel::Gauss1DModel::Gauss1DModel (const Gauss1DModel & *o*) [protected]

Definition at line 20 of file Gauss1DModel.cpp.

8.8.3.3 mappel::Gauss1DModel::Gauss1DModel (Gauss1DModel && *o*) [protected]

Definition at line 26 of file Gauss1DModel.cpp.

8.8.4 Member Function Documentation

8.8.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.8.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.8.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.8.4.4 void ImageFormat1DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 59 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.8.4.5 void ImageFormat1DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 71 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.8.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.8.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.8.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

Referenced by Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2Ds↩ Model(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1↩ DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), set_psf_sigma(), and mappel::Gauss2D↩ Model::set_psf_sigma().

8.8.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

8.8.4.10 void ImageFormat1DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 39 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::global_max_size, and mappel::ImageFormat1DBase::global_min_size.

Referenced by mappel::ImageFormat1DBase::ImageFormat1DBase(), and mappel::ImageFormat1DBase::set_size().

8.8.4.11 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.12 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.13 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.8.4.14 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.15 ImageFormat1DBase::ImageT ImageFormat1DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 108 of file ImageFormat1DBase.h.

8.8.4.16 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.8.4.17 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.8.4.18 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.8.4.19 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.8.4.20 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.8.4.21 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 82 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.8.4.22 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.23 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.8.4.24 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.25 double mappel::Gauss1DModel::get_psf_sigma ( ) const [inline]

Definition at line 127 of file Gauss1DModel.h.

References psf_sigma.

Referenced by get_stats().

8.8.4.26 double mappel::Gauss1DModel::get_psf_sigma (IdxT *idx*) const

Definition at line 131 of file Gauss1DModel.cpp.

References psf_sigma.

8.8.4.27 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.8.4.28 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.8.4.29 ImageFormat1DBase::ImageSizeT ImageFormat1DBase::get_size ( ) const [inline], [inherited]

Definition at line 71 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.8.4.30 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 20 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.8.4.31 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 101 of file ImageFormat1DBase.h.

8.8.4.32 StatsT mappel::Gauss1DModel::get_stats ( ) const

Definition at line 178 of file Gauss1DModel.cpp.

References get_psf_sigma(), mappel::MCMCAdaptor1D::get_stats(), mappel::ImageFormat1DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.8.4.33 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMC↩Adaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.8.4.34 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.35 Gauss1DModel::Stencil mappel::Gauss1DModel::initial_theta_estimate (const ImageT & *im*) const [inline]

Fast, heuristic estimate of initial theta.

Definition at line 169 of file Gauss1DModel.h.

References mappel::PointEmitterModel::make_param(), and mappel::Gauss1DModel::Stencil::theta.

8.8.4.36 Gauss1DModel::Stencil mappel::Gauss1DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) const

Definition at line 207 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::Stencil::bg(), mappel::Gauss1DModel::Stencil::I(), make_stencil(), mappel::↩ PointEmitterModel::num_params, and mappel::ImageFormat1DBase::size.

8.8.4.37 CompositeDist mappel::Gauss1DModel::make_default_prior (IdxT *size,* const std::string & *prior_type*) [static]

Definition at line 59 of file Gauss1DModel.cpp.

References mappel::istarts_with(), make_default_prior_beta_position(), and make_default_prior_normal_position().

8.8.4.38 CompositeDist mappel::Gauss1DModel::make_default_prior_beta_position (IdxT *size*) [static]

Definition at line 80 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩ _intensity(), and mappel::PointEmitterModel::make_prior_component_position_beta().

Referenced by make_default_prior().

8.8.4.39 CompositeDist mappel::Gauss1DModel::make_default_prior_normal_position (IdxT *size*) [static]

Definition at line 90 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩ _intensity(), and mappel::PointEmitterModel::make_prior_component_position_normal().

Referenced by make_default_prior().

8.8.4.40 ImageFormat1DBase::ImageT ImageFormat1DBase::make_image ( ) const [inline], [inherited]

Definition at line 87 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.8.4.41 ImageFormat1DBase::ImageStackT ImageFormat1DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 94 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.8.4.42 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.8.4.43 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.8.4.44 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.8.4.45 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.8.4.46 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.8.4.47 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.8.4.48 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.8.4.49 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.8.4.50 CompositeDist mappel::Gauss1DModel::make_prior_beta_position (IdxT *size,* double *beta_xpos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static]

Definition at line 101 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_prior_component_position_beta().

Referenced by mappel::Gauss2DModel::make_internal_1Dsum_estimator().

8.8.4.51 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.8.4.52 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.8.4.53 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.8.4.54 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = **default_alpha_sigma**) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.8.4.55 CompositeDist mappel::Gauss1DModel::make_prior_normal_position (**IdxT** *size,* double *sigma_xpos,* double *mean_l,* double *kappa_l,* double *mean_bg,* double *kappa_bg*) [static]

Definition at line 114 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_prior_component_position_normal().

Referenced by mappel::Gauss2DModel::make_internal_1Dsum_estimator().

8.8.4.56 Gauss1DModel::Stencil mappel::Gauss1DModel::make_stencil (const **ParamT** & *theta,* bool *compute_derivatives* = `true`) const [inline]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 116 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by initial_theta_estimate().

8.8.4.57 Gauss1DModel & mappel::Gauss1DModel::operator= (const Gauss1DModel & *o*) [protected]

Definition at line 32 of file Gauss1DModel.cpp.

References mappel::MCMCAdaptor1D::operator=(), and psf_sigma.

Referenced by mappel::Gauss1DMAP::operator=(), and mappel::Gauss1DMLE::operator=().

8.8.4.58 Gauss1DModel & mappel::Gauss1DModel::operator= (Gauss1DModel && *o*) [protected]

Definition at line 41 of file Gauss1DModel.cpp.

References DefaultPriorType, mappel::MCMCAdaptor1D::operator=(), prior_types, and psf_sigma.

8.8.4.59 void mappel::Gauss1DModel::pixel_grad (IdxT *i,* const Stencil & *s,* ParamT & *pgrad*) const [inline]

Definition at line 141 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DX, mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel↩ ::Stencil::X.

Referenced by pixel_hess_update().

8.8.4.60 void mappel::Gauss1DModel::pixel_grad2 (IdxT *i,* const Stencil & *s,* ParamT & *pgrad2*) const [inline]

Definition at line 150 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::I(), and psf_sigma.

8.8.4.61 void mappel::Gauss1DModel::pixel_hess (IdxT *i,* const Stencil & *s,* MatT & *hess*) const [inline]

Definition at line 159 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DX, mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::↩ Stencil::I(), and psf_sigma.

8.8.4.62 void mappel::Gauss1DModel::pixel_hess_update (IdxT *i,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const

pixel derivative inner loop calculations.

Definition at line 191 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::I(), mappel::PointEmitterModel↩ ::make_param(), pixel_grad(), and psf_sigma.

8.8.4.63 double mappel::Gauss1DModel::pixel_model_value (IdxT *i,* const Stencil & *s*) const [inline]

Definition at line 135 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::bg(), mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel↩ ::Stencil::X.

8.8.4.64 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.8.4.65 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.8.4.66 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.67 void mappel::MCMCAdaptor1D::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 108 of file MCMCAdaptor1D.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.8.4.68 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.69 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.8.4.70 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = −1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.8.4.71 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.8.4.72 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.73 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.74 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.8.4.75 template<class ImT > void ImageFormat1DBase::set_image_in_stack (ImageStackT & *stack*, ImageCoordT *n*, const ImT & *im*) const [inherited]

Definition at line 115 of file ImageFormat1DBase.h.

8.8.4.76 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = −1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩ Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.8.4.77 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.8.4.78 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩ Ds().

8.8.4.79 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩ _scale.

8.8.4.80 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.8.4.81 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.8.4.82 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.8.4.83 void mappel::Gauss1DModel::set_psf_sigma (double *new_psf_sigma*)

Definition at line 125 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), and psf_sigma.

Referenced by set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.8.4.84 void mappel::Gauss1DModel::set_psf_sigma (const **VecT** & *new_psf_sigma*) [inline]

Definition at line 131 of file Gauss1DModel.h.

References set_psf_sigma().

8.8.4.85 void mappel::PointEmitterModel::set_rng_seed (**RngSeedT** *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.8.4.86 void ImageFormat1DBase::set_size (const **ImageSizeT** & *size_*) [inherited]

Definition at line 30 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::check_size(), and mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::set_size(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DsModel::set_size().

8.8.4.87 void ImageFormat1DBase::set_size (const arma::Col< **ImageCoordT** > & *sz*) [inline], [inherited]

Definition at line 75 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::set_size().

8.8.4.88 void mappel::PointEmitterModel::set_ubound (const **ParamT** & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.8.4.89 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.8.4.90 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.8.5 Member Data Documentation

8.8.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.8.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.8.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.8.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.8.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.8.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.8.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.8.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.8.5.9 const std::string mappel::Gauss1DModel::DefaultPriorType = "Normal" [static]

Definition at line 53 of file Gauss1DModel.h.

Referenced by operator=().

8.8.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.8.5.11 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.8.5.12 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.8.5.13 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.8.5.14 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.8.5.15 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.8.5.16 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static],[inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.8.5.17 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_max_size = 512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 40 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.8.5.18 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static],[inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.8.5.19 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_min_size = 3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 39 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.8.5.20 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel↩ ::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta↩ _estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel↩ ::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::Point↩ EmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.8.5.21 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::num_dim = 1 [static], [inherited]

Number of image dimensions.

Definition at line 38 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.8.5.22 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.8.5.23 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.8.5.24 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.8.5.25 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.8.5.26 const StringVecT mappel::Gauss1DModel::prior_types [static]

Initial value:

```
= { "Beta",
                                                    "Normal"
                                                   }
```

Definition at line 52 of file Gauss1DModel.h.

Referenced by operator=().

8.8.5.27 double mappel::Gauss1DModel::psf_sigma [protected]

Standard deviation of the fixed-sigma 1D Gaussian PSF in pixels

Definition at line 90 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::Stencil::compute_derivatives(), get_psf_sigma(), operator=(), pixel_grad2(), pixel_hess(), pixel_hess_update(), set_psf_sigma(), and mappel::Gauss1DModel::Stencil::Stencil().

8.8.5.28 double mappel::MCMCAdaptorBase::sigma_scale [protected], [inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMC↩Adaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set↩_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMC↩AdaptorBase::set_mcmc_sigma_scale().

8.8.5.29 ImageSizeT mappel::ImageFormat1DBase::size [protected], [inherited]

Number of pixels in X dimension for 1D image

Definition at line 65 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_image_shape(), mappel::Gauss1DsModel::Stencil::compute↩_derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::ImageFormat1DBase::get_num_↩pixels(), mappel::ImageFormat1DBase::get_size(), initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta↩_estimate(), mappel::ImageFormat1DBase::make_image(), mappel::ImageFormat1DBase::make_image_stack(), mappel::ImageFormat1DBase::set_size(), mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::Gauss1DModel↩::Stencil::Stencil().

8.8.5.30 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

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

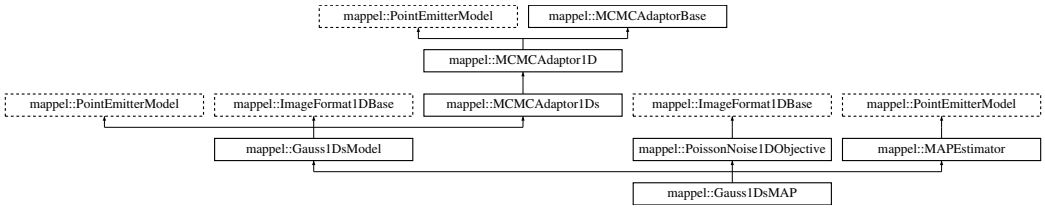
- Gauss1DModel.h
- Gauss1DModel.cpp

8.9 mappel::Gauss1DsMAP Class Reference

A 1D Gaussian with variable PSF sigma under an Poisson read noise assumption and MAP Objective.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss1DsMAP.h>`

Inheritance diagram for mappel::Gauss1DsMAP:



Public Types

- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = CoordT
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Col< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Col< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Mat< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >
- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT

Public Member Functions

- Gauss1DsMAP (arma::Col< ImageCoordT > size, VecT min_sigma, VecT max_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss1DsMAP (ImageSizeT size, double min_sigma, double max_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss1DsMAP (ImageSizeT size, CompositeDist &&prior)
- Gauss1DsMAP (ImageSizeT size, const CompositeDist &prior)
- Gauss1DsMAP (const Gauss1DsMAP &o)
- Gauss1DsMAP & operator= (const Gauss1DsMAP &o)
- Gauss1DsMAP (Gauss1DsMAP &&o)
- Gauss1DsMAP & operator= (Gauss1DsMAP &&o)
- double get_min_sigma () const
- double get_max_sigma () const
- void set_min_sigma (double min_sigma)
- void set_min_sigma (const VecT &min_sigma)
- void set_max_sigma (double max_sigma)
- void set_max_sigma (const VecT &max_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (IdxT i, const Stencil &s) const
- void pixel_grad (IdxT i, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (IdxT i, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (IdxT i, const Stencil &s, MatT &hess) const
- void pixel_hess_update (IdxT i, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const
- Stencil initial_theta_estimate (const ImageT &im) const

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init) const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)

- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- ImageSizeT get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void set_size (const arma::Col< ImageCoordT > &sz)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (IdxT size, double min_sigma, double max_sigma, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (IdxT size, double min_sigma, double max_sigma)
- static CompositeDist make_default_prior_normal_position (IdxT size, double min_sigma, double max_sigma)
- static CompositeDist make_prior_beta_position (IdxT size, double beta_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double min_sigma, double max_sigma, double alpha_sigma)
- static CompositeDist make_prior_normal_position (IdxT size, double sigma_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double min_sigma, double max_sigma, double alpha_sigma)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string name
- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim = 1
- static const ImageCoordT global_min_size = 3
- static const ImageCoordT global_max_size = 512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5
- static const std::vector< std::string > estimator_names

Protected Member Functions

- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_sigma =-1
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.9.1 Detailed Description

A 1D Gaussian with variable PSF sigma under an Poisson read noise assumption and MAP Objective.

Model: Gauss1DsModel a 1D gaussian PSF with variable psf_sigma Objective: PoissonNoise1DObjective - Poisson noise model for 1D Estimator: MAPstimator - Maximum a-posteriori estimator

Definition at line 24 of file Gauss1DsMAP.h.

8.9.2 Member Typedef Documentation

8.9.2.1 using mappel::ImageFormat1DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 25 of file ImageFormat1DBase.h.

8.9.2.2 using mappel::ImageFormat1DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 26 of file ImageFormat1DBase.h.

8.9.2.3 template<class PixelT > using mappel::ImageFormat1DBase::ImageShapeT = arma::Col<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 33 of file ImageFormat1DBase.h.

8.9.2.4 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeShapeT = CoordT [inherited]

Shape of the data type to store 1-image's coordinates

Definition at line 28 of file ImageFormat1DBase.h.

8.9.2.5 using mappel::ImageFormat1DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 30 of file ImageFormat1DBase.h.

8.9.2.6 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeVecShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 29 of file ImageFormat1DBase.h.

8.9.2.7 using mappel::ImageFormat1DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 31 of file ImageFormat1DBase.h.

8.9.2.8 template<class PixelT > using mappel::ImageFormat1DBase::ImageStackShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 34 of file ImageFormat1DBase.h.

8.9.2.9 using mappel::ImageFormat1DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 36 of file ImageFormat1DBase.h.

8.9.2.10 using mappel::ImageFormat1DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 35 of file ImageFormat1DBase.h.

8.9.2.11 using mappel::PoissonNoise1DObjective::ModelDataStackT = ImageStackT [inherited]

Objective function data stack type: 1D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 26 of file PoissonNoise1DObjective.h.

8.9.2.12 using mappel::PoissonNoise1DObjective::ModelDataT = ImageT [inherited]

Objective function data type: 1D double precision image, gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise1DObjective.h.

8.9.2.13 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.9.2.14 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.9.2.15 using mappel::Gauss1DsModel::StencilVecT = std::vector<Stencil> [inherited]

Definition at line 47 of file Gauss1DsModel.h.

8.9.3 Constructor & Destructor Documentation

8.9.3.1 mappel::Gauss1DsMAP::Gauss1DsMAP (arma::Col< ImageCoordT > *size*, VecT *min_sigma*, VecT *max_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 12 of file Gauss1DsMAP.cpp.

8.9.3.2 mappel::Gauss1DsMAP::Gauss1DsMAP (ImageSizeT *size*, double *min_sigma*, double *max_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 16 of file Gauss1DsMAP.cpp.

8.9.3.3 mappel::Gauss1DsMAP::Gauss1DsMAP (ImageSizeT *size*, CompositeDist && *prior*)

Definition at line 20 of file Gauss1DsMAP.cpp.

8.9.3.4 mappel::Gauss1DsMAP::Gauss1DsMAP (ImageSizeT *size,* const CompositeDist & *prior*)

Definition at line 28 of file Gauss1DsMAP.cpp.

8.9.3.5 mappel::Gauss1DsMAP::Gauss1DsMAP (const Gauss1DsMAP & *o*)

Definition at line 36 of file Gauss1DsMAP.cpp.

8.9.3.6 mappel::Gauss1DsMAP::Gauss1DsMAP (Gauss1DsMAP && *o*)

Definition at line 44 of file Gauss1DsMAP.cpp.

8.9.4 Member Function Documentation

8.9.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.9.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.9.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.9.4.4 void ImageFormat1DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 59 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.9.4.5 void ImageFormat1DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 71 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.9.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.9.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.9.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.9.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.9.4.10 void ImageFormat1DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 39 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::global_max_size, and mappel::ImageFormat1DBase::global_min_size.

Referenced by mappel::ImageFormat1DBase::ImageFormat1DBase(), and mappel::ImageFormat1DBase::set_size().

8.9.4.11 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.12 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.13 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.9.4.14 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.15 ImageFormat1DBase::ImageT ImageFormat1DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 108 of file ImageFormat1DBase.h.

8.9.4.16 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.9.4.17 double mappel::Gauss1DsModel::get_max_sigma ( ) const [inline], [inherited]

Definition at line 102 of file Gauss1DsModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss1DsModel::get_stats(), and mappel::Gauss1DsModel::set_min_sigma().

8.9.4.18 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.9.4.19 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.9.4.20 double mappel::Gauss1DsModel::get_min_sigma ( ) const [inline], [inherited]

Definition at line 98 of file Gauss1DsModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss1DsModel::get_stats(), and mappel::Gauss1DsModel::set_max_sigma().

8.9.4.21 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.9.4.22 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.9.4.23 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 82 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.9.4.24 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.25 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.9.4.26 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.27 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.9.4.28 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.9.4.29 ImageFormat1DBase::ImageSizeT ImageFormat1DBase::get_size ( ) const [inline], [inherited]

Definition at line 71 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.9.4.30 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 20 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.9.4.31 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 101 of file ImageFormat1DBase.h.

8.9.4.32 StatsT mappel::Gauss1DsModel::get_stats ( ) const [inherited]

Definition at line 198 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::MCMCAdaptor1Ds::get_stats(), mappel::ImageFormat1DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.9.4.33 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.9.4.34 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.35 Gauss1DsModel::Stencil mappel::Gauss1DsModel::initial_theta_estimate (const ImageT & *im*) const [inline], [inherited]

Fast, heuristic estimate of initial theta.

Definition at line 173 of file Gauss1DsModel.h.

References mappel::PointEmitterModel::make_param().

8.9.4.36 Gauss1DsModel::Stencil mappel::Gauss1DsModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) const [inherited]

Definition at line 231 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::Stencil::bg(), mappel::Gauss1DsModel::Stencil::I(), mappel::PointEmitterModel::lbound, mappel::Gauss1DsModel::make_stencil(), mappel::Gauss1DsModel::Stencil::sigma(), mappel::ImageFormat1DBase::size, and mappel::PointEmitterModel::ubound.

8.9.4.37 CompositeDist mappel::Gauss1DsModel::make_default_prior (IdxT *size,* double *min_sigma,* double *max_sigma,* const std::string & *prior_type*) [static], [inherited]

Definition at line 50 of file Gauss1DsModel.cpp.

References mappel::istarts_with(), mappel::Gauss1DsModel::make_default_prior_beta_position(), and mappel::Gauss1DsModel::make_default_prior_normal_position().

8.9.4.38 CompositeDist mappel::Gauss1DsModel::make_default_prior_beta_position (IdxT *size,* double *min_sigma,* double *max_sigma*) [static], [inherited]

Definition at line 72 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss1DsModel::make_default_prior().

8.9.4.39 CompositeDist mappel::Gauss1DsModel::make_default_prior_normal_position (IdxT *size,* double *min_sigma,* double *max_sigma*) [static], [inherited]

Definition at line 83 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss1DsModel::make_default_prior().

8.9.4.40 ImageFormat1DBase::ImageT ImageFormat1DBase::make_image ( ) const [inline], [inherited]

Definition at line 87 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.9.4.41 ImageFormat1DBase::ImageStackT ImageFormat1DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 94 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.9.4.42 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.9.4.43 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.9.4.44 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.9.4.45 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.9.4.46 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.9.4.47 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.9.4.48 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta↩_stack().

8.9.4.49 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.9.4.50 CompositeDist mappel::Gauss1DsModel::make_prior_beta_position (IdxT *size,* double *beta_xpos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *min_sigma,* double *max_sigma,* double *alpha_sigma*) [static], [inherited]

Definition at line 94 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior↩_component_position_beta(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss2DsModel::make_internal_1Dsum_estimator().

8.9.4.51 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.9.4.52 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size*, double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.9.4.53 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size*, double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.9.4.54 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma*, double *max_sigma*, double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.9.4.55 CompositeDist mappel::Gauss1DsModel::make_prior_normal_position (IdxT *size*, double *sigma_xpos*, double *mean_I*, double *kappa_I*, double *mean_bg*, double *kappa_bg*, double *min_sigma*, double *max_sigma*, double *alpha_sigma*) [static], [inherited]

Definition at line 108 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss2DsModel::make_internal_1Dsum_estimator().

8.9.4.56 Gauss1DsModel::Stencil mappel::Gauss1DsModel::make_stencil (const ParamT & *theta*, bool *compute_derivatives* = true) const [inline], [inherited]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 123 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by mappel::Gauss1DsModel::initial_theta_estimate().

8.9.4.57 Gauss1DsMAP & mappel::Gauss1DsMAP::operator= (const Gauss1DsMAP & *o*)

Definition at line 52 of file Gauss1DsMAP.cpp.

References mappel::MAPEstimator::operator=(), mappel::PoissonNoise1DObjective::operator=(), mappel::Gauss1DsModel::operator=(), and mappel::PointEmitterModel::operator=().

8.9.4.58 Gauss1DsMAP & mappel::Gauss1DsMAP::operator= (Gauss1DsMAP && *o*)

Definition at line 63 of file Gauss1DsMAP.cpp.

References mappel::MAPEstimator::operator=(), mappel::PoissonNoise1DObjective::operator=(), mappel::Gauss1Ds↩Model::operator=(), and mappel::PointEmitterModel::operator=().

8.9.4.59 void mappel::Gauss1DsModel::pixel_grad (IdxT *i,* const Stencil & *s,* ParamT & *pgrad*) const [inline], [inherited]

Definition at line 140 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1Ds↩Model::Stencil::I(), and mappel::Gauss1DsModel::Stencil::X.

Referenced by mappel::Gauss1DsModel::pixel_hess_update().

8.9.4.60 void mappel::Gauss1DsModel::pixel_grad2 (IdxT *i,* const Stencil & *s,* ParamT & *pgrad2*) const [inline], [inherited]

Definition at line 150 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1DsModel::Stencil::DXS2, mappel::Gauss1Ds↩Model::Stencil::I(), and mappel::Gauss1DsModel::Stencil::sigma().

8.9.4.61 void mappel::Gauss1DsModel::pixel_hess (IdxT *i,* const Stencil & *s,* MatT & *hess*) const [inline], [inherited]

Definition at line 160 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1Ds↩Model::Stencil::DXS2, mappel::Gauss1DsModel::Stencil::DXSX, mappel::Gauss1DsModel::Stencil::I(), and mappel::↩Gauss1DsModel::Stencil::sigma().

8.9.4.62 void mappel::Gauss1DsModel::pixel_hess_update (IdxT *i,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const [inherited]

Definition at line 211 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1Ds↩Model::Stencil::DXS2, mappel::Gauss1DsModel::Stencil::DXSX, mappel::Gauss1DsModel::Stencil::I(), mappel::Point↩EmitterModel::make_param(), mappel::Gauss1DsModel::pixel_grad(), and mappel::Gauss1DsModel::Stencil::sigma().

8.9.4.63 double mappel::Gauss1DsModel::pixel_model_value (IdxT *i,* const Stencil & *s*) const [inline], [inherited]

Definition at line 134 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::bg(), mappel::Gauss1DsModel::Stencil::I(), and mappel::Gauss1Ds↩Model::Stencil::X.

8.9.4.64 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.9.4.65 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.9.4.66 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.67 void mappel::MCMCAdaptor1Ds::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 59 of file MCMCAdaptor1Ds.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_I, mappel::MCMCAdaptor1Ds::eta_sigma, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.9.4.68 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.69 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.9.4.70 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = −1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.9.4.71 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.9.4.72 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.73 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.74 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.9.4.75 template<class ImT > void ImageFormat1DBase::set_image_in_stack (ImageStackT & *stack*, ImageCoordT *n*, const ImT & *im*) const [inherited]

Definition at line 115 of file ImageFormat1DBase.h.

8.9.4.76 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = −1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.9.4.77 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.9.4.78 void mappel::Gauss1DsModel::set_max_sigma (double *max_sigma*) [inherited]

Definition at line 135 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::↩PointEmitterModel::prior, and mappel::PointEmitterModel::set_ubound().

Referenced by mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::Gauss2DsModel::set_min_sigma().

8.9.4.79 void mappel::Gauss1DsModel::set_max_sigma (const VecT & *max_sigma*) [inherited]

Definition at line 153 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::set_max_sigma().

8.9.4.80 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩Ds().

8.9.4.81 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩_scale.

8.9.4.82 void mappel::Gauss1DsModel::set_min_sigma (double *min_sigma*) [inherited]

Definition at line 122 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss1DsModel::get_max_sigma(), mappel::↩ PointEmitterModel::prior, and mappel::PointEmitterModel::set_lbound().

Referenced by mappel::Gauss1DsModel::set_min_sigma(), and mappel::Gauss2DsModel::set_min_sigma().

8.9.4.83 void mappel::Gauss1DsModel::set_min_sigma (const VecT & *min_sigma*) [inherited]

Definition at line 148 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::set_min_sigma().

8.9.4.84 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.9.4.85 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.9.4.86 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.9.4.87 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.9.4.88 void ImageFormat1DBase::set_size (const ImageSizeT & *size_*) [inherited]

Definition at line 30 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::check_size(), and mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::set_size(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2↩ DsModel::set_size().

8.9.4.89 void ImageFormat1DBase::set_size (const arma::Col< ImageCoordT > & *sz*) [inline], [inherited]

Definition at line 75 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::set_size().

8.9.4.90 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.9.4.91 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make↩_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::Point↩EmitterModel::theta_stack_in_bounds().

8.9.4.92 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.9.5 Member Data Documentation

8.9.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2↩DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.9.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.9.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static],[inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.9.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static],[inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.9.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static],[inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.9.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static],[inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.9.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static],[inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make↩
_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2↩
DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_↩
normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D↩
::set_background_mcmc_sampling().

8.9.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static],[inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.9.5.9 const std::string mappel::Gauss1DsModel::DefaultPriorType = "Normal" [static], [inherited]

Definition at line 51 of file Gauss1DsModel.h.

Referenced by mappel::Gauss1DsModel::operator=().

8.9.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.9.5.11 const std::vector< std::string > mappel::PoissonNoise1DObjective::estimator_names [static], [inherited]

Definition at line 24 of file PoissonNoise1DObjective.h.

8.9.5.12 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.9.5.13 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.9.5.14 double mappel::MCMCAdaptor1Ds::eta_sigma =-1 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor1Ds.h.

Referenced by mappel::MCMCAdaptor1Ds::get_stats(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor1Ds::operator=(), and mappel::MCMCAdaptor1Ds::sample_mcmc_candidate().

8.9.5.15 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.9.5.16 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.9.5.17 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.9.5.18 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.9.5.19 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_max_size = 512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 40 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.9.5.20 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.9.5.21 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_min_size = 3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 39 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.9.5.22 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.9.5.23 const std::string mappel::Gauss1DsMAP::name [static]

Definition at line 35 of file Gauss1DsMAP.h.

8.9.5.24 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::num_dim = 1 [static], [inherited]

Number of image dimensions.

Definition at line 38 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.9.5.25 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.9.5.26 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.9.5.27 IdxT mappel::MCMCAdaptorBase::num_phases [protected],[inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.9.5.28 CompositeDist mappel::PointEmitterModel::prior [protected],[inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.9.5.29 const StringVecT mappel::Gauss1DsModel::prior_types [static],[inherited]

Initial value:

```
= { "Beta",
                                                    "Normal"
                                                  }
```

Definition at line 50 of file Gauss1DsModel.h.

Referenced by mappel::Gauss1DsModel::operator=().

8.9.5.30 double mappel::MCMCAdaptorBase::sigma_scale [protected],[inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.9.5.31 ImageSizeT mappel::ImageFormat1DBase::size [protected], [inherited]

Number of pixels in X dimension for 1D image

Definition at line 65 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_image_shape(), mappel::Gauss1DsModel::Stencil::compute_derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::ImageFormat1DBase::get_num_pixels(), mappel::ImageFormat1DBase::get_size(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::ImageFormat1DBase::make_image(), mappel::ImageFormat1DBase::make_image_stack(), mappel::ImageFormat1DBase::set_size(), mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::Gauss1DModel::Stencil::Stencil().

8.9.5.32 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

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

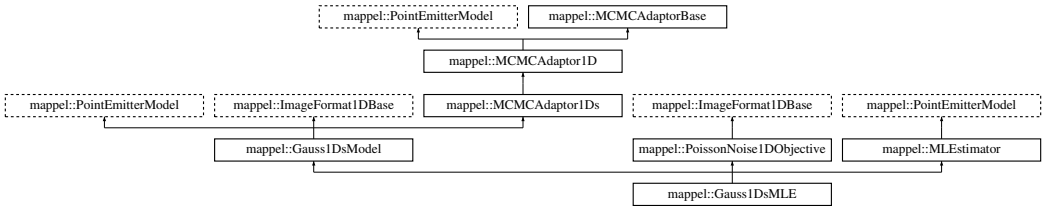
- Gauss1DsMAP.h
- Gauss1DsMAP.cpp

8.10 mappel::Gauss1DsMLE Class Reference

A 1D Gaussian with variable PSF under an Poisson noise assumption and maximum-likelihood estimator.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss1DsMLE.h>`

Inheritance diagram for mappel::Gauss1DsMLE:



Public Types

- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = CoordT
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Col< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Col< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Mat< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >
- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT

Public Member Functions

- Gauss1DsMLE (arma::Col< ImageCoordT > size, VecT min_sigma, VecT max_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss1DsMLE (ImageSizeT size, double min_sigma, double max_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss1DsMLE (ImageSizeT size, CompositeDist &&prior)
- Gauss1DsMLE (ImageSizeT size, const CompositeDist &prior)
- Gauss1DsMLE (const Gauss1DsMLE &o)
- Gauss1DsMLE & operator= (const Gauss1DsMLE &o)
- Gauss1DsMLE (Gauss1DsMLE &&o)
- Gauss1DsMLE & operator= (Gauss1DsMLE &&o)
- double get_min_sigma () const
- double get_max_sigma () const
- void set_min_sigma (double min_sigma)
- void set_min_sigma (const VecT &min_sigma)
- void set_max_sigma (double max_sigma)
- void set_max_sigma (const VecT &max_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (IdxT i, const Stencil &s) const
- void pixel_grad (IdxT i, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (IdxT i, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (IdxT i, const Stencil &s, MatT &hess) const
- void pixel_hess_update (IdxT i, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const
- Stencil initial_theta_estimate (const ImageT &im) const

Fast, heuristic estimate of initial theta.

- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init) const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const

- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- ImageSizeT get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void set_size (const arma::Col< ImageCoordT > &sz)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (IdxT size, double min_sigma, double max_sigma, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (IdxT size, double min_sigma, double max_sigma)
- static CompositeDist make_default_prior_normal_position (IdxT size, double min_sigma, double max_sigma)
- static CompositeDist make_prior_beta_position (IdxT size, double beta_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double min_sigma, double max_sigma, double alpha_sigma)
- static CompositeDist make_prior_normal_position (IdxT size, double sigma_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double min_sigma, double max_sigma, double alpha_sigma)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string name
- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim = 1
- static const ImageCoordT global_min_size = 3
- static const ImageCoordT global_max_size = 512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5
- static const std::vector< std::string > estimator_names

Protected Member Functions

- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_sigma =-1
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.10.1 Detailed Description

A 1D Gaussian with variable PSF under an Poisson noise assumption and maximum-likelihood estimator.

Model: Gauss1DsModel - 1D Gaussian PSF with variable PSF sigma Objective: PoissonNoise1DObjective - Poisson noise model for 1D Estimator: MLEstimator - Pure-likelihood estimator

Definition at line 24 of file Gauss1DsMLE.h.

8.10.2 Member Typedef Documentation

8.10.2.1 using mappel::ImageFormat1DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 25 of file ImageFormat1DBase.h.

8.10.2.2 using mappel::ImageFormat1DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 26 of file ImageFormat1DBase.h.

8.10.2.3 template<class PixelT > using mappel::ImageFormat1DBase::ImageShapeT = arma::Col<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 33 of file ImageFormat1DBase.h.

8.10.2.4 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeShapeT = CoordT [inherited]

Shape of the data type to store 1-image's coordinates

Definition at line 28 of file ImageFormat1DBase.h.

8.10.2.5 using mappel::ImageFormat1DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 30 of file ImageFormat1DBase.h.

8.10.2.6 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeVecShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 29 of file ImageFormat1DBase.h.

8.10.2.7 using mappel::ImageFormat1DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 31 of file ImageFormat1DBase.h.

8.10.2.8 template<class PixelT > using mappel::ImageFormat1DBase::ImageStackShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 34 of file ImageFormat1DBase.h.

8.10.2.9 using mappel::ImageFormat1DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 36 of file ImageFormat1DBase.h.

8.10.2.10 using mappel::ImageFormat1DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 35 of file ImageFormat1DBase.h.

8.10.2.11 using mappel::PoissonNoise1DObjective::ModelDataStackT = ImageStackT [inherited]

Objective function data stack type: 1D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 26 of file PoissonNoise1DObjective.h.

8.10.2.12 using mappel::PoissonNoise1DObjective::ModelDataT = ImageT [inherited]

Objective function data type: 1D double precision image, gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise1DObjective.h.

8.10.2.13 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.10.2.14 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.10.2.15 using mappel::Gauss1DsModel::StencilVecT = std::vector<Stencil> [inherited]

Definition at line 47 of file Gauss1DsModel.h.

8.10.3 Constructor & Destructor Documentation

8.10.3.1 mappel::Gauss1DsMLE::Gauss1DsMLE (arma::Col< ImageCoordT > *size,* VecT *min_sigma,* VecT *max_sigma,* const std::string & *prior_type* = DefaultPriorType)

Definition at line 12 of file Gauss1DsMLE.cpp.

8.10.3.2 mappel::Gauss1DsMLE::Gauss1DsMLE (ImageSizeT *size,* double *min_sigma,* double *max_sigma,* const std::string & *prior_type* = DefaultPriorType)

Definition at line 16 of file Gauss1DsMLE.cpp.

8.10.3.3 mappel::Gauss1DsMLE::Gauss1DsMLE (ImageSizeT *size,* CompositeDist && *prior*)

Definition at line 20 of file Gauss1DsMLE.cpp.

8.10.3.4 mappel::Gauss1DsMLE::Gauss1DsMLE (ImageSizeT *size,* const CompositeDist & *prior*)

Definition at line 28 of file Gauss1DsMLE.cpp.

8.10.3.5 mappel::Gauss1DsMLE::Gauss1DsMLE (const Gauss1DsMLE & *o*)

Definition at line 36 of file Gauss1DsMLE.cpp.

8.10.3.6 mappel::Gauss1DsMLE::Gauss1DsMLE (Gauss1DsMLE && *o*)

Definition at line 44 of file Gauss1DsMLE.cpp.

8.10.4 Member Function Documentation

8.10.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.10.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.10.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.10.4.4 void ImageFormat1DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 59 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.10.4.5 void ImageFormat1DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 71 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.10.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.10.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.10.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.10.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

8.10.4.10 void ImageFormat1DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 39 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::global_max_size, and mappel::ImageFormat1DBase::global_min_size.

Referenced by mappel::ImageFormat1DBase::ImageFormat1DBase(), and mappel::ImageFormat1DBase::set_size().

8.10.4.11 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.12 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.13 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.10.4.14 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.15 ImageFormat1DBase::ImageT ImageFormat1DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 108 of file ImageFormat1DBase.h.

8.10.4.16 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.10.4.17 double mappel::Gauss1DsModel::get_max_sigma ( ) const [inline], [inherited]

Definition at line 102 of file Gauss1DsModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss1DsModel::get_stats(), and mappel::Gauss1DsModel::set_min_sigma().

8.10.4.18 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.10.4.19 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.10.4.20 double mappel::Gauss1DsModel::get_min_sigma ( ) const [inline], [inherited]

Definition at line 98 of file Gauss1DsModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss1DsModel::get_stats(), and mappel::Gauss1DsModel::set_max_sigma().

8.10.4.21 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.10.4.22 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.10.4.23 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 82 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.10.4.24 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.25 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.10.4.26 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.27 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.10.4.28 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.10.4.29 ImageFormat1DBase::ImageSizeT ImageFormat1DBase::get_size ( ) const [inline], [inherited]

Definition at line 71 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.10.4.30 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 20 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.10.4.31 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 101 of file ImageFormat1DBase.h.

8.10.4.32 StatsT mappel::Gauss1DsModel::get_stats ( ) const [inherited]

Definition at line 198 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::MCM↩CAdaptor1Ds::get_stats(), mappel::ImageFormat1DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.10.4.33 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMC↩Adaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.10.4.34 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.35 Gauss1DsModel::StencilI mappel::Gauss1DsModel::initial_theta_estimate (const ImageT & *im*) const [inline], [inherited]

Fast, heuristic estimate of initial theta.

Definition at line 173 of file Gauss1DsModel.h.

References mappel::PointEmitterModel::make_param().

8.10.4.36 Gauss1DsModel::StencilI mappel::Gauss1DsModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) const [inherited]

Definition at line 231 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::Stencil::bg(), mappel::Gauss1DsModel::Stencil::I(), mappel::PointEmitter↩Model::lbound, mappel::Gauss1DsModel::make_stencil(), mappel::Gauss1DsModel::Stencil::sigma(), mappel::Image↩Format1DBase::size, and mappel::PointEmitterModel::ubound.

8.10.4.37 CompositeDist mappel::Gauss1DsModel::make_default_prior (IdxT *size,* double *min_sigma,* double *max_sigma,* const std::string & *prior_type*) [static],[inherited]

Definition at line 50 of file Gauss1DsModel.cpp.

References mappel::istarts_with(), mappel::Gauss1DsModel::make_default_prior_beta_position(), and mappel::Gauss1DsModel::make_default_prior_normal_position().

8.10.4.38 CompositeDist mappel::Gauss1DsModel::make_default_prior_beta_position (IdxT *size,* double *min_sigma,* double *max_sigma*) [static],[inherited]

Definition at line 72 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss1DsModel::make_default_prior().

8.10.4.39 CompositeDist mappel::Gauss1DsModel::make_default_prior_normal_position (IdxT *size,* double *min_sigma,* double *max_sigma*) [static],[inherited]

Definition at line 83 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss1DsModel::make_default_prior().

8.10.4.40 ImageFormat1DBase::ImageT ImageFormat1DBase::make_image ( ) const [inline],[inherited]

Definition at line 87 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.10.4.41 ImageFormat1DBase::ImageStackT ImageFormat1DBase::make_image_stack (ImageCoordT *n*) const [inline],[inherited]

Definition at line 94 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.10.4.42 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline],[inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.10.4.43 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.10.4.44 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.10.4.45 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.10.4.46 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.10.4.47 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.10.4.48 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta↩_stack().

8.10.4.49 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.10.4.50 CompositeDist mappel::Gauss1DsModel::make_prior_beta_position (IdxT *size,* double *beta_xpos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *min_sigma,* double *max_sigma,* double *alpha_sigma*) [static], [inherited]

Definition at line 94 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior↩ _component_position_beta(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss2DsModel::make_internal_1Dsum_estimator().

8.10.4.51 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = **default_mean_I**, double *kappa* = **default_intensity_kappa**) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_↩ default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2Ds↩ Model::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel↩ ::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_↩ position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_↩ beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta↩ _position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_↩ position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_↩ position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.10.4.52 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = **default_beta_pos**) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_↩ default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2Ds↩ Model::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2↩ DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2Ds↩ Model::make_prior_beta_position().

8.10.4.53 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = **default_sigma_pos**) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_↩ default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2↩ DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel↩ ::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.10.4.54 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = **default_alpha_sigma**) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.10.4.55 CompositeDist mappel::Gauss1DsModel::make_prior_normal_position (**IdxT** *size,* double *sigma_xpos,* double *mean_l,* double *kappa_l,* double *mean_bg,* double *kappa_bg,* double *min_sigma,* double *max_sigma,* double *alpha_sigma*) [static], [inherited]

Definition at line 108 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss2DsModel::make_internal_1Dsum_estimator().

8.10.4.56 Gauss1DsModel::Stencil mappel::Gauss1DsModel::make_stencil (const **ParamT** & *theta,* bool *compute_derivatives* = `true`) const [inline], [inherited]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 123 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by mappel::Gauss1DsModel::initial_theta_estimate().

8.10.4.57 Gauss1DsMLE & mappel::Gauss1DsMLE::operator= (const Gauss1DsMLE & *o*)

Definition at line 52 of file Gauss1DsMLE.cpp.

References mappel::MLEstimator::operator=(), mappel::PoissonNoise1DObjective::operator=(), mappel::Gauss1Ds↩Model::operator=(), and mappel::PointEmitterModel::operator=().

8.10.4.58 Gauss1DsMLE & mappel::Gauss1DsMLE::operator= (Gauss1DsMLE && *o*)

Definition at line 63 of file Gauss1DsMLE.cpp.

References mappel::MLEstimator::operator=(), mappel::PoissonNoise1DObjective::operator=(), mappel::Gauss1Ds↩Model::operator=(), and mappel::PointEmitterModel::operator=().

8.10.4.59 void mappel::Gauss1DsModel::pixel_grad (IdxT *i,* const Stencil & *s,* ParamT & *pgrad*) const [inline], [inherited]

Definition at line 140 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1Ds↩Model::Stencil::I(), and mappel::Gauss1DsModel::Stencil::X.

Referenced by mappel::Gauss1DsModel::pixel_hess_update().

8.10.4.60 void mappel::Gauss1DsModel::pixel_grad2 (IdxT *i,* const Stencil & *s,* ParamT & *pgrad2*) const [inline], [inherited]

Definition at line 150 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1DsModel::Stencil::DXS2, mappel::Gauss1Ds↩Model::Stencil::I(), and mappel::Gauss1DsModel::Stencil::sigma().

8.10.4.61 void mappel::Gauss1DsModel::pixel_hess (IdxT *i,* const Stencil & *s,* MatT & *hess*) const [inline], [inherited]

Definition at line 160 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1Ds↩Model::Stencil::DXS2, mappel::Gauss1DsModel::Stencil::DXSX, mappel::Gauss1DsModel::Stencil::I(), and mappel::↩Gauss1DsModel::Stencil::sigma().

8.10.4.62 void mappel::Gauss1DsModel::pixel_hess_update (IdxT *i,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const [inherited]

Definition at line 211 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1Ds↩Model::Stencil::DXS2, mappel::Gauss1DsModel::Stencil::DXSX, mappel::Gauss1DsModel::Stencil::I(), mappel::Point↩EmitterModel::make_param(), mappel::Gauss1DsModel::pixel_grad(), and mappel::Gauss1DsModel::Stencil::sigma().

8.10.4.63 double mappel::Gauss1DsModel::pixel_model_value (IdxT *i,* const Stencil & *s*) const [inline], [inherited]

Definition at line 134 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::bg(), mappel::Gauss1DsModel::Stencil::I(), and mappel::Gauss1Ds↩ Model::Stencil::X.

8.10.4.64 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩ EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.10.4.65 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.10.4.66 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.67 void mappel::MCMCAdaptor1Ds::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 59 of file MCMCAdaptor1Ds.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_I, mappel::MCMCAdaptor1Ds::eta_↩ sigma, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.10.4.68 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.69 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.10.4.70 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.10.4.71 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.10.4.72 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.73 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.74 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.10.4.75 template<class ImT > void ImageFormat1DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 115 of file ImageFormat1DBase.h.

8.10.4.76 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = -1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.10.4.77 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.10.4.78 void mappel::Gauss1DsModel::set_max_sigma (double *max_sigma*) [inherited]

Definition at line 135 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::↩PointEmitterModel::prior, and mappel::PointEmitterModel::set_ubound().

Referenced by mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::Gauss2DsModel::set_min_sigma().

8.10.4.79 void mappel::Gauss1DsModel::set_max_sigma (const VecT & *max_sigma*) [inherited]

Definition at line 153 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::set_max_sigma().

8.10.4.80 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩Ds().

8.10.4.81 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩ _scale.

8.10.4.82 void mappel::Gauss1DsModel::set_min_sigma (double *min_sigma*) [inherited]

Definition at line 122 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss1DsModel::get_max_sigma(), mappel::↩ PointEmitterModel::prior, and mappel::PointEmitterModel::set_lbound().

Referenced by mappel::Gauss1DsModel::set_min_sigma(), and mappel::Gauss2DsModel::set_min_sigma().

8.10.4.83 void mappel::Gauss1DsModel::set_min_sigma (const VecT & *min_sigma*) [inherited]

Definition at line 148 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::set_min_sigma().

8.10.4.84 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.10.4.85 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.10.4.86 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.10.4.87 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.10.4.88 void ImageFormat1DBase::set_size (const ImageSizeT & *size_*) [inherited]

Definition at line 30 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::check_size(), and mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::set_size(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2↩DsModel::set_size().

8.10.4.89 void ImageFormat1DBase::set_size (const arma::Col< ImageCoordT > & *sz*) [inline], [inherited]

Definition at line 75 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::set_size().

8.10.4.90 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.10.4.91 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make↩_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::Point↩EmitterModel::theta_stack_in_bounds().

8.10.4.92 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.10.5 Member Data Documentation

8.10.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2↩DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.10.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.10.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.10.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.10.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.10.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.10.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make↩
_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2↩
DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_↩
normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D↩
::set_background_mcmc_sampling().

8.10.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.10.5.9 const std::string mappel::Gauss1DsModel::DefaultPriorType = "Normal" [static], [inherited]

Definition at line 51 of file Gauss1DsModel.h.

Referenced by mappel::Gauss1DsModel::operator=().

8.10.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.10.5.11 const std::vector< std::string > mappel::PoissonNoise1DObjective::estimator_names [static], [inherited]

Definition at line 24 of file PoissonNoise1DObjective.h.

8.10.5.12 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.10.5.13 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.10.5.14 double mappel::MCMCAdaptor1Ds::eta_sigma =-1 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor1Ds.h.

Referenced by mappel::MCMCAdaptor1Ds::get_stats(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::↩ MCMCAdaptor1Ds::operator=(), and mappel::MCMCAdaptor1Ds::sample_mcmc_candidate().

8.10.5.15 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1↩ D::sample_mcmc_candidate().

8.10.5.16 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.10.5.17 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.10.5.18 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.10.5.19 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_max_size = 512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 40 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.10.5.20 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.10.5.21 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_min_size = 3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 39 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.10.5.22 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.10.5.23 const std::string mappel::Gauss1DsMLE::name [static]

Definition at line 35 of file Gauss1DsMLE.h.

8.10.5.24 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::num_dim = 1 [static], [inherited]

Number of image dimensions.

Definition at line 38 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.10.5.25 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.10.5.26 IdxT mappel::PointEmitterModel::num_params [protected],[inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.10.5.27 IdxT mappel::MCMCAdaptorBase::num_phases [protected],[inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.10.5.28 CompositeDist mappel::PointEmitterModel::prior [protected],[inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.10.5.29 const StringVecT mappel::Gauss1DsModel::prior_types [static],[inherited]

Initial value:

```
= { "Beta",
                                                  "Normal"
                                                }
```

Definition at line 50 of file Gauss1DsModel.h.

Referenced by mappel::Gauss1DsModel::operator=().

8.10.5.30 double mappel::MCMCAdaptorBase::sigma_scale [protected],[inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMC↩Adaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set↩_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMC↩AdaptorBase::set_mcmc_sigma_scale().

8.10.5.31 ImageSizeT mappel::ImageFormat1DBase::size [protected],[inherited]

Number of pixels in X dimension for 1D image

Definition at line 65 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_image_shape(), mappel::Gauss1DsModel::Stencil::compute↩_derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::ImageFormat1DBase::get_num↩_pixels(), mappel::ImageFormat1DBase::get_size(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::↩Gauss1DsModel::initial_theta_estimate(), mappel::ImageFormat1DBase::make_image(), mappel::ImageFormat1↩DBase::make_image_stack(), mappel::ImageFormat1DBase::set_size(), mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::Gauss1DModel::Stencil::Stencil().

8.10.5.32 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel↩::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta↩_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel↩::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::Point↩EmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

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

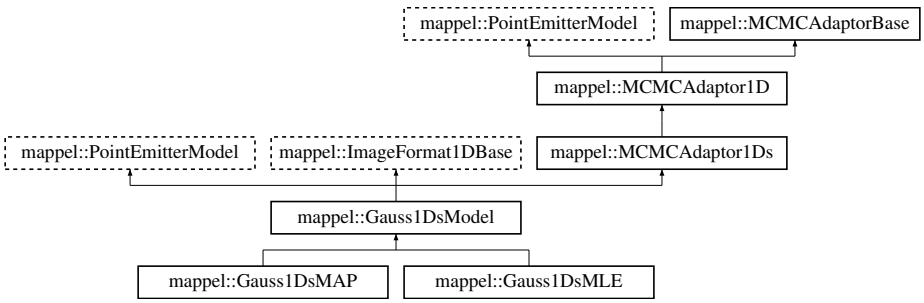
- Gauss1DsMLE.h
- Gauss1DsMLE.cpp

8.11 mappel::Gauss1DsModel Class Reference

Base class for 1D Gaussian PSF with variable Gaussian sigma (standard deviation) measured in units of pixels.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss1DsModel.h>`

Inheritance diagram for mappel::Gauss1DsModel:



Classes

- class Stencil

  Stencil for 1D variable-sigma models.

Public Types

- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = CoordT
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Col< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Col< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Mat< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >

Public Member Functions

- double get_min_sigma () const
- double get_max_sigma () const
- void set_min_sigma (double min_sigma)
- void set_max_sigma (double max_sigma)
- void set_min_sigma (const VecT &min_sigma)
- void set_max_sigma (const VecT &max_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (IdxT i, const Stencil &s) const
- void pixel_grad (IdxT i, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (IdxT i, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (IdxT i, const Stencil &s, MatT &hess) const
- void pixel_hess_update (IdxT i, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const
- Stencil initial_theta_estimate (const ImageT &im) const

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init) const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const

- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- ImageSizeT get_size () const

- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void set_size (const arma::Col< ImageCoordT > &sz)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (IdxT size, double min_sigma, double max_sigma, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (IdxT size, double min_sigma, double max_sigma)
- static CompositeDist make_default_prior_normal_position (IdxT size, double min_sigma, double max_sigma)
- static CompositeDist make_prior_beta_position (IdxT size, double beta_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double min_sigma, double max_sigma, double alpha_sigma)
- static CompositeDist make_prior_normal_position (IdxT size, double sigma_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double min_sigma, double max_sigma, double alpha_sigma)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1

- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim = 1
- static const ImageCoordT global_min_size = 3
- static const ImageCoordT global_max_size = 512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5

Protected Member Functions

- Gauss1DsModel (IdxT size_)
- Gauss1DsModel (const Gauss1DsModel &o)
- Gauss1DsModel (Gauss1DsModel &&o)
- Gauss1DsModel & operator= (const Gauss1DsModel &o)
- Gauss1DsModel & operator= (Gauss1DsModel &&o)
- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_sigma =-1
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.11.1 Detailed Description

Base class for 1D Gaussian PSF with variable Gaussian sigma (standard deviation) measured in units of pixels.

Definition at line 19 of file Gauss1DsModel.h.

8.11.2 Member Typedef Documentation

8.11.2.1 using mappel::ImageFormat1DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 25 of file ImageFormat1DBase.h.

8.11.2.2 using mappel::ImageFormat1DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 26 of file ImageFormat1DBase.h.

8.11.2.3 template<class PixelT > using mappel::ImageFormat1DBase::ImageShapeT = arma::Col<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 33 of file ImageFormat1DBase.h.

8.11.2.4 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeShapeT = CoordT [inherited]

Shape of the data type to store 1-image's coordinates

Definition at line 28 of file ImageFormat1DBase.h.

8.11.2.5 using mappel::ImageFormat1DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 30 of file ImageFormat1DBase.h.

8.11.2.6 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeVecShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 29 of file ImageFormat1DBase.h.

8.11.2.7 using mappel::ImageFormat1DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 31 of file ImageFormat1DBase.h.

8.11.2.8 template<class PixelT > using mappel::ImageFormat1DBase::ImageStackShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 34 of file ImageFormat1DBase.h.

8.11.2.9 using mappel::ImageFormat1DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 36 of file ImageFormat1DBase.h.

8.11.2.10 using mappel::ImageFormat1DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 35 of file ImageFormat1DBase.h.

8.11.2.11 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.11.2.12 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.11.2.13 using mappel::Gauss1DsModel::StencilVecT = std::vector<Stencil>

Definition at line 47 of file Gauss1DsModel.h.

8.11.3 Constructor & Destructor Documentation

8.11.3.1 mappel::Gauss1DsModel::Gauss1DsModel (IdxT *size_*) [explicit], [protected]

Definition at line 12 of file Gauss1DsModel.cpp.

8.11.3.2 mappel::Gauss1DsModel::Gauss1DsModel (const Gauss1DsModel & *o*) [protected]

Definition at line 17 of file Gauss1DsModel.cpp.

8.11.3.3 mappel::Gauss1DsModel::Gauss1DsModel (Gauss1DsModel && *o*) [protected]

Definition at line 22 of file Gauss1DsModel.cpp.

8.11.4 Member Function Documentation

8.11.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.11.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.11.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.11.4.4 void ImageFormat1DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 59 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.11.4.5 void ImageFormat1DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 71 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.11.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.11.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.11.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::↩ Gauss2DsModel::Gauss2DsModel(), set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel↩ ::set_psf_sigma().

8.11.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

8.11.4.10 void ImageFormat1DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 39 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::global_max_size, and mappel::ImageFormat1DBase::global_min_size.

Referenced by mappel::ImageFormat1DBase::ImageFormat1DBase(), and mappel::ImageFormat1DBase::set_size().

8.11.4.11 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.12 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.13 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.11.4.14 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.15 ImageFormat1DBase::ImageT ImageFormat1DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 108 of file ImageFormat1DBase.h.

8.11.4.16 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.11.4.17 double mappel::Gauss1DsModel::get_max_sigma ( ) const [inline]

Definition at line 102 of file Gauss1DsModel.h.

References mappel::PointEmitterModel::prior.

Referenced by get_stats(), and set_min_sigma().

8.11.4.18 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.11.4.19 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.11.4.20 double mappel::Gauss1DsModel::get_min_sigma ( ) const [inline]

Definition at line 98 of file Gauss1DsModel.h.

References mappel::PointEmitterModel::prior.

Referenced by get_stats(), and set_max_sigma().

8.11.4.21 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.11.4.22 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.11.4.23 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 82 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.11.4.24 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.25 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.11.4.26 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.27 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.11.4.28 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.11.4.29 ImageFormat1DBase::ImageSizeT ImageFormat1DBase::get_size ( ) const [inline], [inherited]

Definition at line 71 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.11.4.30 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 20 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.11.4.31 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 101 of file ImageFormat1DBase.h.

8.11.4.32 StatsT mappel::Gauss1DsModel::get_stats ( ) const

Definition at line 198 of file Gauss1DsModel.cpp.

References get_max_sigma(), get_min_sigma(), mappel::MCMCAdaptor1Ds::get_stats(), mappel::ImageFormat1D↩ Base::get_stats(), and mappel::PointEmitterModel::get_stats().

8.11.4.33 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMC↩ Adaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.11.4.34 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.35 Gauss1DsModel::StencilI mappel::Gauss1DsModel::initial_theta_estimate (const ImageT & *im*) const [inline]

Fast, heuristic estimate of initial theta.

Definition at line 173 of file Gauss1DsModel.h.

References mappel::PointEmitterModel::make_param().

8.11.4.36 Gauss1DsModel::StencilI mappel::Gauss1DsModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) const

Definition at line 231 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::Stencil::bg(), mappel::Gauss1DsModel::Stencil::I(), mappel::PointEmitter↩Model::lbound, make_stencil(), mappel::Gauss1DsModel::Stencil::sigma(), mappel::ImageFormat1DBase::size, and mappel::PointEmitterModel::ubound.

8.11.4.37 CompositeDist mappel::Gauss1DsModel::make_default_prior (IdxT *size,* double *min_sigma,* double *max_sigma,* const std::string & *prior_type*) [static]

Definition at line 50 of file Gauss1DsModel.cpp.

References mappel::istarts_with(), make_default_prior_beta_position(), and make_default_prior_normal_position().

8.11.4.38 CompositeDist mappel::Gauss1DsModel::make_default_prior_beta_position (IdxT *size,* double *min_sigma,* double *max_sigma*) [static]

Definition at line 72 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), and mappel::PointEmitterModel↩::make_prior_component_sigma().

Referenced by make_default_prior().

8.11.4.39 CompositeDist mappel::Gauss1DsModel::make_default_prior_normal_position (IdxT *size,* double *min_sigma,* double *max_sigma*) [static]

Definition at line 83 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::PointEmitterModel↩::make_prior_component_sigma().

Referenced by make_default_prior().

8.11.4.40 ImageFormat1DBase::ImageT ImageFormat1DBase::make_image ( ) const [inline], [inherited]

Definition at line 87 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.11.4.41 ImageFormat1DBase::ImageStackT ImageFormat1DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 94 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.11.4.42 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.11.4.43 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.11.4.44 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.11.4.45 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.11.4.46 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.11.4.47 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.11.4.48 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta↩_stack().

8.11.4.49 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.11.4.50 CompositeDist mappel::Gauss1DsModel::make_prior_beta_position (IdxT *size,* double *beta_xpos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *min_sigma,* double *max_sigma,* double *alpha_sigma*) [static]

Definition at line 94 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior↩_component_position_beta(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss2DsModel::make_internal_1Dsum_estimator().

8.11.4.51 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta↩_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior↩_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), make_prior_beta_position(), mappel↩::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::↩Gauss2DModel::make_prior_normal_position(), make_prior_normal_position(), mappel::Gauss1DModel::make_prior↩_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.11.4.52 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.11.4.53 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.11.4.54 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.11.4.55 CompositeDist mappel::Gauss1DsModel::make_prior_normal_position (IdxT *size,* double *sigma_xpos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *min_sigma,* double *max_sigma,* double *alpha_sigma*) [static]

Definition at line 108 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::PointEmitterModel::make_prior_component_sigma().

Referenced by mappel::Gauss2DsModel::make_internal_1Dsum_estimator().

8.11.4.56 Gauss1DsModel::Stencil mappel::Gauss1DsModel::make_stencil (const ParamT & *theta,* bool *compute_derivatives* = true) const [inline]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 123 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by initial_theta_estimate().

8.11.4.57 Gauss1DsModel & mappel::Gauss1DsModel::operator= (const Gauss1DsModel & *o*) [protected]

Definition at line 27 of file Gauss1DsModel.cpp.

References mappel::MCMCAdaptor1Ds::operator=().

Referenced by mappel::Gauss1DsMAP::operator=(), and mappel::Gauss1DsMLE::operator=().

8.11.4.58 Gauss1DsModel & mappel::Gauss1DsModel::operator= (Gauss1DsModel && *o*) [protected]

Definition at line 35 of file Gauss1DsModel.cpp.

References DefaultPriorType, mappel::MCMCAdaptor1Ds::operator=(), and prior_types.

8.11.4.59 void mappel::Gauss1DsModel::pixel_grad (IdxT *i*, const Stencil & *s*, ParamT & *pgrad*) const [inline]

Definition at line 140 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1Ds↩Model::Stencil::I(), and mappel::Gauss1DsModel::Stencil::X.

Referenced by pixel_hess_update().

8.11.4.60 void mappel::Gauss1DsModel::pixel_grad2 (IdxT *i*, const Stencil & *s*, ParamT & *pgrad2*) const [inline]

Definition at line 150 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1DsModel::Stencil::DXS2, mappel::Gauss1Ds↩Model::Stencil::I(), and mappel::Gauss1DsModel::Stencil::sigma().

8.11.4.61 void mappel::Gauss1DsModel::pixel_hess (IdxT *i,* const Stencil & *s,* MatT & *hess*) const [inline]

Definition at line 160 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1Ds↩ Model::Stencil::DXS2, mappel::Gauss1DsModel::Stencil::DXSX, mappel::Gauss1DsModel::Stencil::I(), and mappel::↩ Gauss1DsModel::Stencil::sigma().

8.11.4.62 void mappel::Gauss1DsModel::pixel_hess_update (IdxT *i,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const

Definition at line 211 of file Gauss1DsModel.cpp.

References mappel::Gauss1DsModel::Stencil::DX, mappel::Gauss1DsModel::Stencil::DXS, mappel::Gauss1Ds↩ Model::Stencil::DXS2, mappel::Gauss1DsModel::Stencil::DXSX, mappel::Gauss1DsModel::Stencil::I(), mappel::↩ PointEmitterModel::make_param(), pixel_grad(), and mappel::Gauss1DsModel::Stencil::sigma().

8.11.4.63 double mappel::Gauss1DsModel::pixel_model_value (IdxT *i,* const Stencil & *s*) const [inline]

Definition at line 134 of file Gauss1DsModel.h.

References mappel::Gauss1DsModel::Stencil::bg(), mappel::Gauss1DsModel::Stencil::I(), and mappel::Gauss1Ds↩ Model::Stencil::X.

8.11.4.64 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩ EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.11.4.65 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.11.4.66 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.67 void mappel::MCMCAdaptor1Ds::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 59 of file MCMCAdaptor1Ds.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor1Ds::eta_↩ sigma, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.11.4.68 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.69 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.11.4.70 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::Point↩ EmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_↩ ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.11.4.71 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_,* const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.11.4.72 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.73 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name,* double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.74 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.11.4.75 template<class ImT > void ImageFormat1DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 115 of file ImageFormat1DBase.h.

8.11.4.76 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = -1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.11.4.77 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by set_min_sigma().

8.11.4.78 void mappel::Gauss1DsModel::set_max_sigma (double *max_sigma*)

Definition at line 135 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), get_min_sigma(), mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::set_ubound().

Referenced by set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::Gauss2DsModel↩::set_min_sigma().

8.11.4.79 void mappel::Gauss1DsModel::set_max_sigma (const VecT & *max_sigma*)

Definition at line 153 of file Gauss1DsModel.cpp.

References set_max_sigma().

8.11.4.80 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩Ds().

8.11.4.81 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩_scale.

8.11.4.82 void mappel::Gauss1DsModel::set_min_sigma (double *min_sigma*)

Definition at line 122 of file Gauss1DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), get_max_sigma(), mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::set_lbound().

Referenced by set_min_sigma(), and mappel::Gauss2DsModel::set_min_sigma().

8.11.4.83 void mappel::Gauss1DsModel::set_min_sigma (const VecT & *min_sigma*)

Definition at line 148 of file Gauss1DsModel.cpp.

References set_min_sigma().

8.11.4.84 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.11.4.85 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.11.4.86 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.11.4.87 void mappel::PointEmitterModel::set_rng_seed (**RngSeedT** *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.11.4.88 void ImageFormat1DBase::set_size (const **ImageSizeT** & *size_*) [inherited]

Definition at line 30 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::check_size(), and mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::set_size(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DsModel::set_size().

8.11.4.89 void ImageFormat1DBase::set_size (const arma::Col< **ImageCoordT** > & *sz*) [inline], [inherited]

Definition at line 75 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::set_size().

8.11.4.90 void mappel::PointEmitterModel::set_ubound (const **ParamT** & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.11.4.91 bool mappel::PointEmitterModel::theta_in_bounds (const **ParamT** & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.11.4.92 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.11.5 Member Data Documentation

8.11.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2↩DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.11.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.11.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.11.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.11.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.11.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.11.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.11.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.11.5.9 const std::string mappel::Gauss1DsModel::DefaultPriorType = "Normal" [static]

Definition at line 51 of file Gauss1DsModel.h.

Referenced by operator=().

8.11.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.11.5.11 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.11.5.12 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.11.5.13 double mappel::MCMCAdaptor1Ds::eta_sigma =-1 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor1Ds.h.

Referenced by mappel::MCMCAdaptor1Ds::get_stats(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::↩ MCMCAdaptor1Ds::operator=(), and mappel::MCMCAdaptor1Ds::sample_mcmc_candidate().

8.11.5.14 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1↩ D::sample_mcmc_candidate().

8.11.5.15 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.11.5.16 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.11.5.17 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.11.5.18 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_max_size = 512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 40 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.11.5.19 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.11.5.20 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_min_size = 3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 39 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.11.5.21 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.11.5.22 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::num_dim = 1 [static], [inherited]

Number of image dimensions.

Definition at line 38 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.11.5.23 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.11.5.24 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.11.5.25 IdxT mappel::MCMCAdaptorBase::num_phases [protected],[inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.11.5.26 CompositeDist mappel::PointEmitterModel::prior [protected],[inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), get_max_sigma(), get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), set_max_sigma(), set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.11.5.27 const StringVecT mappel::Gauss1DsModel::prior_types [static]

Initial value:

```
= { "Beta",
                                                    "Normal"
                                                  }
```

Definition at line 50 of file Gauss1DsModel.h.

Referenced by operator=().

8.11.5.28 double mappel::MCMCAdaptorBase::sigma_scale [protected],[inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.11.5.29 ImageSizeT mappel::ImageFormat1DBase::size [protected],[inherited]

Number of pixels in X dimension for 1D image

Definition at line 65 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_image_shape(), mappel::Gauss1DsModel::Stencil::compute_derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::ImageFormat1DBase::get_num_pixels(), mappel::ImageFormat1DBase::get_size(), mappel::Gauss1DModel::initial_theta_estimate(), initial_theta_estimate(), mappel::ImageFormat1DBase::make_image(), mappel::ImageFormat1DBase::make_image_stack(), mappel::ImageFormat1DBase::set_size(), mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::Gauss1DModel::Stencil::Stencil().

8.11.5.30 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

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

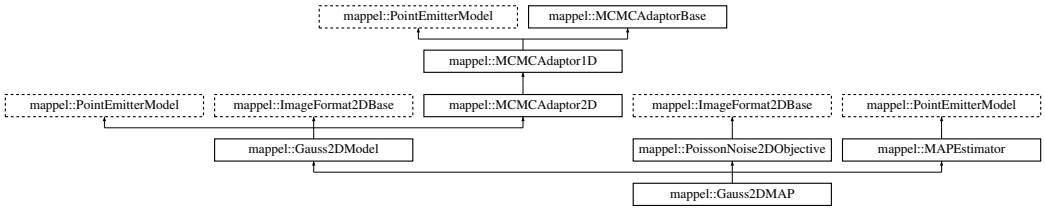
- Gauss1DsModel.h
- Gauss1DsModel.cpp

8.12 mappel::Gauss2DMAP Class Reference

A 2D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DMAP.h>`

Inheritance diagram for mappel::Gauss2DMAP:



Public Types

- using Gauss1DSumModelT = Gauss1DMAP
- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = arma::Col< CoordT >
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Mat< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Mat< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Cube< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >
- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT

Public Member Functions

- Gauss2DMAP (ImageCoordT size, double psf_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss2DMAP (const ImageSizeT &size, double psf_sigma, const std::string &prior_type=DefaultPriorType)
- template<class IntType , class FloatType >
  Gauss2DMAP (const arma::Col< IntType > &size, const arma::Col< FloatType > &psf_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss2DMAP (const ImageSizeT &size, const VecT &psf_sigma, CompositeDist &&prior)
- Gauss2DMAP (ImageSizeT &&size, VecT &&psf_sigma, CompositeDist &&prior)
- Gauss2DMAP (const ImageSizeT &size, const VecT &psf_sigma, const CompositeDist &prior)
- Gauss2DMAP (const Gauss2DMAP &o)
- Gauss2DMAP & operator= (const Gauss2DMAP &o)
- Gauss2DMAP (Gauss2DMAP &&o)
- Gauss2DMAP & operator= (Gauss2DMAP &&o)
- void set_hyperparams (const VecT &hyperparams)
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- void set_size (const ImageSizeT &size_)
- const VecT & get_psf_sigma () const
- double get_psf_sigma (IdxT idx) const
- void set_psf_sigma (double new_psf_sigma)
- void set_psf_sigma (const VecT &new_psf_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (int i, int j, const Stencil &s) const
- void pixel_grad (int i, int j, const Stencil &s, ParamT &pgrad) const

- void pixel_grad2 (int i, int j, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (int i, int j, const Stencil &s, MatT &hess) const
- void pixel_hess_update (int i, int j, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im)

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init)
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init, const std::string &estimator)
- Gauss1DSumModelT debug_internal_sum_model_x () const
- Gauss1DSumModelT debug_internal_sum_model_y () const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- IdxT get_num_hyperparams () const
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const

- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- const ImageSizeT & get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (const ImageSizeT &size, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (const ImageSizeT &size)
- static CompositeDist make_default_prior_normal_position (const ImageSizeT &size)
- static CompositeDist make_prior_beta_position (const ImageSizeT &size, double beta_xpos, double beta_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static CompositeDist make_prior_normal_position (const ImageSizeT &size, double sigma_xpos, double beta_↩ ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string name
- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim =2
- static const ImageCoordT global_min_size =3
- static const ImageCoordT global_max_size =512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5
- static const std::vector< std::string > estimator_names

Protected Member Functions

- void update_internal_1Dsum_estimators ()
- void set_mcmc_num_phases (IdxT num_phases)

Static Protected Member Functions

- static Gauss1DSumModelT make_internal_1Dsum_estimator (IdxT dim, const ImageSizeT &size, const VecT &psf_sigma, const CompositeDist &prior)

Protected Attributes

- VecT psf_sigma
- Gauss1DSumModelT x_model
- Gauss1DSumModelT y_model
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_y =0
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.12.1 Detailed Description

A 2D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.

Model: Gauss2DModel a 2D gaussian PSF with fixed psf_sigma Objective: PoissonNoise2DObjective - Poisson noise model for 2D Estimator: MAPEstimator - Maximum a-posteriori estimator

Definition at line 23 of file Gauss2DMAP.h.

8.12.2 Member Typedef Documentation

8.12.2.1 using mappel::Gauss2DModel::Gauss1DSumModelT = Gauss1DMAP [inherited]

Definition at line 23 of file Gauss2DModel.h.

8.12.2.2 using mappel::ImageFormat2DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 24 of file ImageFormat2DBase.h.

8.12.2.3 using mappel::ImageFormat2DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 25 of file ImageFormat2DBase.h.

8.12.2.4 template<class PixelT > using mappel::ImageFormat2DBase::ImageShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 32 of file ImageFormat2DBase.h.

8.12.2.5 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a single image's coordinates

Definition at line 27 of file ImageFormat2DBase.h.

8.12.2.6 using mappel::ImageFormat2DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 29 of file ImageFormat2DBase.h.

8.12.2.7 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeVecShapeT = arma::Mat<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 28 of file ImageFormat2DBase.h.

8.12.2.8 using mappel::ImageFormat2DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 30 of file ImageFormat2DBase.h.

8.12.2.9 template<class PixelT > using mappel::ImageFormat2DBase::ImageStackShapeT = arma::Cube<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 33 of file ImageFormat2DBase.h.

8.12.2.10 using mappel::ImageFormat2DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 35 of file ImageFormat2DBase.h.

8.12.2.11 using mappel::ImageFormat2DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 34 of file ImageFormat2DBase.h.

8.12.2.12 using mappel::PoissonNoise2DObjective::ModelDataStackT = ImageStackT [inherited]

Objective function data stack type: 2D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise2DObjective.h.

8.12.2.13 using mappel::PoissonNoise2DObjective::ModelDataT = ImageT [inherited]

Objective function data type: 2D double precision image, gain-corrected to approximate photons counts

Definition at line 24 of file PoissonNoise2DObjective.h.

8.12.2.14 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.12.2.15 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.12.2.16 using mappel::Gauss2DModel::StencilVecT = std::vector<Stencil> [inherited]

Definition at line 47 of file Gauss2DModel.h.

8.12.3 Constructor & Destructor Documentation

8.12.3.1 mappel::Gauss2DMAP::Gauss2DMAP (ImageCoordT *size*, double *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 11 of file Gauss2DMAP.cpp.

8.12.3.2 mappel::Gauss2DMAP::Gauss2DMAP (const ImageSizeT & *size*, double *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 15 of file Gauss2DMAP.cpp.

8.12.3.3 template<class IntType , class FloatType > mappel::Gauss2DMAP::Gauss2DMAP (const arma::Col< IntType > & *size*, const arma::Col< FloatType > & *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 41 of file Gauss2DMAP.h.

8.12.3.4 mappel::Gauss2DMAP::Gauss2DMAP (const ImageSizeT & *size*, const VecT & *psf_sigma*, CompositeDist && *prior*)

Definition at line 27 of file Gauss2DMAP.cpp.

8.12.3.5 mappel::Gauss2DMAP::Gauss2DMAP (ImageSizeT && *size*, VecT && *psf_sigma*, CompositeDist && *prior*)

Definition at line 19 of file Gauss2DMAP.cpp.

8.12.3.6 mappel::Gauss2DMAP::Gauss2DMAP (const ImageSizeT & *size*, const VecT & *psf_sigma*, const CompositeDist & *prior*)

Definition at line 35 of file Gauss2DMAP.cpp.

8.12.3.7 mappel::Gauss2DMAP::Gauss2DMAP (const Gauss2DMAP & *o*)

Definition at line 43 of file Gauss2DMAP.cpp.

8.12.3.8 mappel::Gauss2DMAP::Gauss2DMAP (Gauss2DMAP && *o*)

Definition at line 51 of file Gauss2DMAP.cpp.

8.12.4 Member Function Documentation

8.12.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.12.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.12.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.12.4.4 void mappel::ImageFormat2DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 80 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.12.4.5 void mappel::ImageFormat2DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 93 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.12.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.12.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.12.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.12.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.12.4.10 void mappel::ImageFormat2DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 60 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::global_max_size, and mappel::ImageFormat2DBase::global_min_size.

Referenced by mappel::ImageFormat2DBase::ImageFormat2DBase(), and mappel::ImageFormat2DBase::set_size().

8.12.4.11 Gauss1DSumModelT mappel::Gauss2DModel::debug_internal_sum_model_x ( ) const [inline], [inherited]

Definition at line 89 of file Gauss2DModel.h.

References mappel::Gauss2DModel::x_model.

8.12.4.12 Gauss1DSumModelT mappel::Gauss2DModel::debug_internal_sum_model_y ( ) const [inline], [inherited]

Definition at line 90 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::operator=(), mappel::PointEmitterModel::prior, mappel::Gauss2DModel::psf_sigma, mappel::ImageFormat2DBase::size, mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DModel::y_model.

8.12.4.13 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.14 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.15 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.12.4.16 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.17 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 106 of file ImageFormat2DBase.h.

8.12.4.18 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.12.4.19 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.12.4.20 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.12.4.21 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.12.4.22 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.12.4.23 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 79 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.12.4.24 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.25 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.12.4.26 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.27 const VecT & mappel::Gauss2DModel::get_psf_sigma ( ) const [inline], [inherited]

Definition at line 142 of file Gauss2DModel.h.

References mappel::Gauss2DModel::psf_sigma.

Referenced by mappel::Gauss2DModel::get_stats().

8.12.4.28 double mappel::Gauss2DModel::get_psf_sigma (IdxT *idx*) const [inherited]

Definition at line 132 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::DefaultPriorType, mappel::Gauss2DModel::prior_types, and mappel::Gauss2D↩ Model::psf_sigma.

8.12.4.29 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.12.4.30 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.12.4.31 const ImageFormat2DBase::ImageSizeT & mappel::ImageFormat2DBase::get_size ( ) const [inline], [inherited]

Definition at line 74 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.12.4.32 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 41 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.12.4.33 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 99 of file ImageFormat2DBase.h.

8.12.4.34 StatsT mappel::Gauss2DModel::get_stats ( ) const [inherited]

Definition at line 268 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::get_psf_sigma(), mappel::MCMCAdaptor2D::get_stats(), mappel::ImageFormat2DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.12.4.35 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.12.4.36 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.37 Gauss2DModel::StencilI mappel::Gauss2DModel::initial_theta_estimate (const ImageT & *im*) [inline], [inherited]

Fast, heuristic estimate of initial theta.

Definition at line 194 of file Gauss2DModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::PointEmitterModel::make_param().

Referenced by mappel::Gauss2DModel::initial_theta_estimate().

8.12.4.38 Gauss2DModel::StencilI mappel::Gauss2DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) [inline], [inherited]

Definition at line 201 of file Gauss2DModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::Gauss2DModel::initial_theta_estimate().

8.12.4.39 Gauss2DModel::StencilI mappel::Gauss2DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init,* const std::string & *estimator*) [inherited]

Definition at line 303 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::Stencil::bg(), mappel::methods::estimate_max(), mappel::Gauss2DModel::Stencil::I(), mappel::PointEmitterModel::lbound, mappel::Gauss2DModel::make_stencil(), mappel::PointEmitterModel::num_params, mappel::ImageFormat2DBase::size, mappel::PointEmitterModel::theta_in_bounds(), mappel::PointEmitterModel::ubound, mappel::Gauss2DModel::x_model, and mappel::Gauss2DModel::y_model.

8.12.4.40 CompositeDist mappel::Gauss2DModel::make_default_prior (const ImageSizeT & *size,* const std::string & *prior_type*) [static], [inherited]

Definition at line 150 of file Gauss2DModel.cpp.

References mappel::istarts_with(), mappel::Gauss2DModel::make_default_prior_beta_position(), and mappel::Gauss2DModel::make_default_prior_normal_position().

8.12.4.41 CompositeDist mappel::Gauss2DModel::make_default_prior_beta_position (const ImageSizeT & *size*) [static], [inherited]

Definition at line 171 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DModel::make_default_prior().

8.12.4.42 CompositeDist mappel::Gauss2DModel::make_default_prior_normal_position (const ImageSizeT & *size*) [static], [inherited]

Definition at line 182 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DModel::make_default_prior().

8.12.4.43 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::make_image ( ) const [inline], [inherited]

Definition at line 85 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.12.4.44 ImageFormat2DBase::ImageStackT mappel::ImageFormat2DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 92 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.12.4.45 Gauss2DModel::Gauss1DSumModelT mappel::Gauss2DModel::make_internal_1Dsum_estimator (IdxT *dim,* const ImageSizeT & *size,* const VecT & *psf_sigma,* const CompositeDist & *prior*) [static], [protected], [inherited]

Definition at line 62 of file Gauss2DModel.cpp.

References mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_normal_↩position(), mappel::Gauss2DModel::psf_sigma, and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), and mappel::Gauss2DModel::update_internal_1Dsum_estimators().

8.12.4.46 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::↩Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel↩::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_↩update().

8.12.4.47 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.12.4.48 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.12.4.49 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.12.4.50 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.12.4.51 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.12.4.52 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.12.4.53 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.12.4.54 CompositeDist mappel::Gauss2DModel::make_prior_beta_position (const ImageSizeT & *size,* double *beta_xpos,* double *beta_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static], [inherited]

Definition at line 193 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), and mappel::ImageFormat2DBase::size.

8.12.4.55 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.12.4.56 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.12.4.57 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.12.4.58 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.12.4.59 CompositeDist mappel::Gauss2DModel::make_prior_normal_position (const ImageSizeT & *size,* double *sigma_xpos,* double *beta_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static], [inherited]

Definition at line 206 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::ImageFormat2DBase::size.

8.12.4.60 Gauss2DModel::Stencil mappel::Gauss2DModel::make_stencil (const ParamT & *theta,* bool *compute_derivatives* = true) const [inline], [inherited]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 131 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by mappel::Gauss2DModel::initial_theta_estimate().

8.12.4.61 Gauss2DMAP & mappel::Gauss2DMAP::operator= (const Gauss2DMAP & *o*)

Definition at line 59 of file Gauss2DMAP.cpp.

References mappel::MAPEstimator::operator=(), mappel::PoissonNoise2DObjective::operator=(), mappel::Image↩Format2DBase::operator=(), mappel::Gauss2DModel::operator=(), and mappel::PointEmitterModel::operator=().

8.12.4.62 Gauss2DMAP & mappel::Gauss2DMAP::operator= (Gauss2DMAP && *o*)

Definition at line 70 of file Gauss2DMAP.cpp.

References mappel::MAPEstimator::operator=(), mappel::PoissonNoise2DObjective::operator=(), mappel::Image↩Format2DBase::operator=(), mappel::Gauss2DModel::operator=(), and mappel::PointEmitterModel::operator=().

8.12.4.63 void mappel::Gauss2DModel::pixel_grad (int *i*, int *j*, const Stencil & *s*, ParamT & *pgrad*) const [inline], [inherited]

Definition at line 159 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DY, mappel::Gauss2DModel::↩Stencil::I(), mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

Referenced by mappel::Gauss2DModel::pixel_hess_update().

8.12.4.64 void mappel::Gauss2DModel::pixel_grad2 (int *i*, int *j*, const Stencil & *s*, ParamT & *pgrad2*) const [inline], [inherited]

Definition at line 170 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::↩Stencil::I(), mappel::Gauss2DModel::psf_sigma, mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::↩Stencil::Y.

8.12.4.65 void mappel::Gauss2DModel::pixel_hess (int *i,* int *j,* const Stencil & *s,* MatT & *hess*) const [inline], [inherited]

Definition at line 181 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::Stencil::DY, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::Stencil::I(), mappel::Gauss2DModel::psf_sigma, mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.12.4.66 void mappel::Gauss2DModel::pixel_hess_update (int *i,* int *j,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const [inherited]

pixel derivative inner loop calculations.

Definition at line 282 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::Stencil::DY, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::Stencil::I(), mappel::PointEmitterModel::make_param(), mappel::Gauss2DModel::pixel_grad(), mappel::Gauss2DModel::psf_sigma, mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.12.4.67 double mappel::Gauss2DModel::pixel_model_value (int *i,* int *j,* const Stencil & *s*) const [inline], [inherited]

Definition at line 152 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::bg(), mappel::Gauss2DModel::Stencil::I(), mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.12.4.68 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.12.4.69 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.12.4.70 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.71 void mappel::MCMCAdaptor2D::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 59 of file MCMCAdaptor2D.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptor2D::eta_y, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.12.4.72 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.73 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.12.4.74 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.12.4.75 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_,* const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.12.4.76 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.77 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name,* double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.78 void mappel::Gauss2DModel::set_hyperparams (const VecT & *hyperparams*) [inherited]

Definition at line 109 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::set_hyperparams(), and mappel::Gauss2DModel::update_internal_1Dsum_↩ estimators().

8.12.4.79 template<class ImT > void mappel::ImageFormat2DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 113 of file ImageFormat2DBase.h.

8.12.4.80 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = -1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩ Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.12.4.81 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.12.4.82 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩ Ds().

8.12.4.83 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩ _scale.

8.12.4.84 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.12.4.85 void mappel::Gauss2DModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 97 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::set_prior(), and mappel::Gauss2DModel::update_internal_1Dsum_↩ estimators().

8.12.4.86 void mappel::Gauss2DModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 103 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::set_prior(), and mappel::Gauss2DModel::update_internal_1Dsum_↩ estimators().

8.12.4.87 void mappel::Gauss2DModel::set_psf_sigma (double *new_psf_sigma*) [inline], [inherited]

Definition at line 146 of file Gauss2DModel.h.

8.12.4.88 void mappel::Gauss2DModel::set_psf_sigma (const VecT & *new_psf_sigma*) [inherited]

Definition at line 123 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss2DModel::psf_sigma, mappel::Gauss1D↩ Model::set_psf_sigma(), mappel::Gauss2DModel::x_model, and mappel::Gauss2DModel::y_model.

8.12.4.89 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.12.4.90 void mappel::Gauss2DModel::set_size (const ImageSizeT & *size_*) [inherited]

Definition at line 115 of file Gauss2DModel.cpp.

References mappel::ImageFormat2DBase::set_size(), mappel::ImageFormat1DBase::set_size(), mappel::Image↩ Format2DBase::size, mappel::Gauss2DModel::x_model, and mappel::Gauss2DModel::y_model.

8.12.4.91 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.12.4.92 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.12.4.93 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.12.4.94 void mappel::Gauss2DModel::update_internal_1Dsum_estimators ( ) [protected], [inherited]

Definition at line 91 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::get_prior(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::psf_sigma, mappel::ImageFormat2DBase::size, mappel::Gauss2DModel::x_model, and mappel::Gauss2DModel::y_model.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DModel::set_prior().

8.12.5 Member Data Documentation

8.12.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.12.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.12.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.12.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.12.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.12.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.12.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make↩
_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2↩
DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_↩
normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D↩
::set_background_mcmc_sampling().

8.12.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.12.5.9 const std::string mappel::Gauss2DModel::DefaultPriorType = "Normal" [static], [inherited]

Definition at line 51 of file Gauss2DModel.h.

Referenced by mappel::Gauss2DModel::get_psf_sigma().

8.12.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.12.5.11 const std::vector< std::string > mappel::PoissonNoise2DObjective::estimator_names [static], [inherited]

Definition at line 23 of file PoissonNoise2DObjective.h.

8.12.5.12 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.12.5.13 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.12.5.14 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.12.5.15 double mappel::MCMCAdaptor2D::eta_y =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_y in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor2D.h.

Referenced by mappel::MCMCAdaptor2D::get_stats(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MC↩ MCAdaptor2D::operator=(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor2D↩ ::sample_mcmc_candidate().

8.12.5.16 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.12.5.17 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.12.5.18 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.12.5.19 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_max_size =512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 39 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.12.5.20 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.12.5.21 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_min_size =3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 38 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.12.5.22 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.12.5.23 const std::string mappel::Gauss2DMAP::name [static]

Definition at line 37 of file Gauss2DMAP.h.

8.12.5.24 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::num_dim =2 [static], [inherited]

Number of image dimensions.

Definition at line 37 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.12.5.25 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.12.5.26 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.12.5.27 IdxT mappel::MCMCAdaptorBase::num_phases [protected],[inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.12.5.28 CompositeDist mappel::PointEmitterModel::prior [protected],[inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.12.5.29 const StringVecT mappel::Gauss2DModel::prior_types [static],[inherited]

Initial value:

```
= { "Beta",
                                                    "Normal"
                                                  }
```

Definition at line 50 of file Gauss2DModel.h.

Referenced by mappel::Gauss2DModel::get_psf_sigma().

8.12.5.30 VecT mappel::Gauss2DModel::psf_sigma [protected],[inherited]

Standard deviation of the fixed-sigma 1D Gaussian PSF in pixels

Definition at line 104 of file Gauss2DModel.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss_heuristic_compute_estimate(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DModel::get_psf_sigma(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::operator=(), mappel::Gauss2DModel::pixel_grad2(), mappel::Gauss2DModel::pixel_hess(), mappel::Gauss2DModel::pixel_hess_update(), mappel::Gauss2DModel::set_psf_sigma(), mappel::Gauss2DModel::Stencil::Stencil(), and mappel::Gauss2DModel::update_internal_1Dsum_estimators().

8.12.5.31 double mappel::MCMCAdaptorBase::sigma_scale [protected],[inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMC↩Adaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set↩_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMC↩AdaptorBase::set_mcmc_sigma_scale().

8.12.5.32 ImageSizeT mappel::ImageFormat2DBase::size [protected],[inherited]

Number of pixels in X dimension for 1D image

Definition at line 67 of file ImageFormat2DBase.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss↩_heuristic_compute_estimate(), mappel::ImageFormat2DBase::check_image_shape(), mappel::Gauss2DModel::↩Stencil::compute_derivatives(), mappel::Gauss2DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel↩::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::methods↩::expected_information(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsMAP::Gauss2DsMA↩P(), mappel::Gauss2DsMLE::Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Image↩Format2DBase::get_num_pixels(), mappel::ImageFormat2DBase::get_size(), mappel::ImageFormat2DBase::get↩_stats(), mappel::methods::likelihood::grad(), mappel::methods::likelihood::grad2(), mappel::methods::likelihood↩::debug::grad_components(), mappel::methods::likelihood::hessian(), mappel::methods::likelihood::debug::hessian↩_components(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), mappel::Gauss2DModel↩::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::↩Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal↩_position(), mappel::ImageFormat2DBase::make_image(), mappel::ImageFormat2DBase::make_image_stack(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::make_internal_1Dsum_↩estimator(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_↩position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss2DsModel::make_prior_normal↩_position(), mappel::methods::model_image(), mappel::ImageFormat2DBase::operator=(), mappel::methods↩::likelihood::rllh(), mappel::methods::likelihood::debug::rllh_components(), mappel::ImageFormat2DBase::set_↩size(), mappel::Gauss2DModel::set_size(), mappel::Gauss2DsModel::set_size(), mappel::methods::simulate_image(), mappel::methods::simulate_image_from_model(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss2Ds↩Model::Stencil::Stencil(), mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2Ds↩Model::update_internal_1Dsum_estimators().

8.12.5.33 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel↩::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta↩_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel↩::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::Point↩EmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.12.5.34 Gauss1DSumModelT mappel::Gauss2DModel::x_model [protected], [inherited]

X-model fits 2D images X-axis (column sum)

Definition at line 105 of file Gauss2DModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_x(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DModel::operator=(), mappel::Gauss2DModel::set_psf_sigma(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DModel::update_internal_1Dsum_estimators().

8.12.5.35 Gauss1DSumModelT mappel::Gauss2DModel::y_model [protected], [inherited]

Y-model fits 2D images Y-axis (row sum)

Definition at line 106 of file Gauss2DModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DModel::operator=(), mappel::Gauss2DModel::set_psf_sigma(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DModel::update_internal_1Dsum_estimators().

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

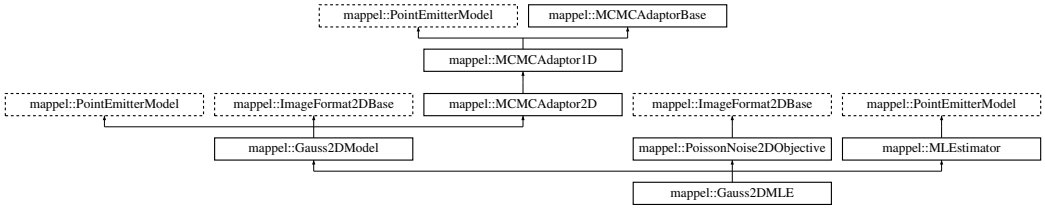
- Gauss2DMAP.h
- Gauss2DMAP.cpp

8.13 mappel::Gauss2DMLE Class Reference

A 2D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DMLE.h>`

Inheritance diagram for mappel::Gauss2DMLE:



Public Types

- using Gauss1DSumModelT = Gauss1DMAP
- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = arma::Col< CoordT >
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Mat< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Mat< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Cube< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >
- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT

Public Member Functions

- Gauss2DMLE (ImageCoordT size, double psf_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss2DMLE (const ImageSizeT &size, double psf_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss2DMLE (const ImageSizeT &size, const VecT &psf_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss2DMLE (const ImageSizeT &size, const VecT &psf_sigma, CompositeDist &&prior)
- Gauss2DMLE (const ImageSizeT &size, const VecT &psf_sigma, const CompositeDist &prior)
- Gauss2DMLE (const Gauss2DMLE &o)
- Gauss2DMLE & operator= (const Gauss2DMLE &o)
- Gauss2DMLE (Gauss2DMLE &&o)
- Gauss2DMLE & operator= (Gauss2DMLE &&o)
- void set_hyperparams (const VecT &hyperparams)
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- void set_size (const ImageSizeT &size_)
- const VecT & get_psf_sigma () const
- double get_psf_sigma (IdxT idx) const
- void set_psf_sigma (double new_psf_sigma)
- void set_psf_sigma (const VecT &new_psf_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (int i, int j, const Stencil &s) const
- void pixel_grad (int i, int j, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (int i, int j, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (int i, int j, const Stencil &s, MatT &hess) const

- void pixel_hess_update (int i, int j, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im)

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init)
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init, const std::string &estimator)
- Gauss1DSumModelT debug_internal_sum_model_x () const
- Gauss1DSumModelT debug_internal_sum_model_y () const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- IdxT get_num_hyperparams () const
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const

- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- const ImageSizeT & get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (const ImageSizeT &size, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (const ImageSizeT &size)
- static CompositeDist make_default_prior_normal_position (const ImageSizeT &size)
- static CompositeDist make_prior_beta_position (const ImageSizeT &size, double beta_xpos, double beta_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static CompositeDist make_prior_normal_position (const ImageSizeT &size, double sigma_xpos, double beta_↩ ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string name
- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim =2
- static const ImageCoordT global_min_size =3
- static const ImageCoordT global_max_size =512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5
- static const std::vector< std::string > estimator_names

Protected Member Functions

- void update_internal_1Dsum_estimators ()
- void set_mcmc_num_phases (IdxT num_phases)

Static Protected Member Functions

- static Gauss1DSumModelT make_internal_1Dsum_estimator (IdxT dim, const ImageSizeT &size, const VecT &psf_sigma, const CompositeDist &prior)

Protected Attributes

- VecT psf_sigma
- Gauss1DSumModelT x_model
- Gauss1DSumModelT y_model
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_y =0
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.13.1 Detailed Description

A 2D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective.

Model: Gauss2DModel - 2D Gaussian PSF with fixed PSF sigma Objective: PoissonNoise2DObjective - Poisson noise model for 2D Estimator: MLEstimator - Pure-likelihood estimator

Definition at line 24 of file Gauss2DMLE.h.

8.13.2 Member Typedef Documentation

8.13.2.1 using mappel::Gauss2DModel::Gauss1DSumModelT = Gauss1DMAP [inherited]

Definition at line 23 of file Gauss2DModel.h.

8.13.2.2 using mappel::ImageFormat2DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 24 of file ImageFormat2DBase.h.

8.13.2.3 using mappel::ImageFormat2DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 25 of file ImageFormat2DBase.h.

8.13.2.4 template<class PixelT > using mappel::ImageFormat2DBase::ImageShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 32 of file ImageFormat2DBase.h.

8.13.2.5 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a single image's coordinates

Definition at line 27 of file ImageFormat2DBase.h.

8.13.2.6 using mappel::ImageFormat2DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 29 of file ImageFormat2DBase.h.

8.13.2.7 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeVecShapeT = arma::Mat<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 28 of file ImageFormat2DBase.h.

8.13.2.8 using mappel::ImageFormat2DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 30 of file ImageFormat2DBase.h.

8.13.2.9 template<class PixelT > using mappel::ImageFormat2DBase::ImageStackShapeT = arma::Cube<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 33 of file ImageFormat2DBase.h.

8.13.2.10 using mappel::ImageFormat2DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 35 of file ImageFormat2DBase.h.

8.13.2.11 using mappel::ImageFormat2DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 34 of file ImageFormat2DBase.h.

8.13.2.12 using mappel::PoissonNoise2DObjective::ModelDataStackT = ImageStackT [inherited]

Objective function data stack type: 2D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise2DObjective.h.

8.13.2.13 using mappel::PoissonNoise2DObjective::ModelDataT = ImageT [inherited]

Objective function data type: 2D double precision image, gain-corrected to approximate photons counts

Definition at line 24 of file PoissonNoise2DObjective.h.

8.13.2.14 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.13.2.15 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.13.2.16 using mappel::Gauss2DModel::StencilVecT = std::vector<Stencil> [inherited]

Definition at line 47 of file Gauss2DModel.h.

8.13.3 Constructor & Destructor Documentation

8.13.3.1 mappel::Gauss2DMLE::Gauss2DMLE (ImageCoordT *size*, double *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 11 of file Gauss2DMLE.cpp.

8.13.3.2 mappel::Gauss2DMLE::Gauss2DMLE (const ImageSizeT & *size*, double *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 15 of file Gauss2DMLE.cpp.

8.13.3.3 mappel::Gauss2DMLE::Gauss2DMLE (const ImageSizeT & *size*, const VecT & *psf_sigma*, const std::string & *prior_type* = DefaultPriorType)

Definition at line 19 of file Gauss2DMLE.cpp.

8.13.3.4 mappel::Gauss2DMLE::Gauss2DMLE (const ImageSizeT & *size*, const VecT & *psf_sigma*, CompositeDist && *prior*)

Definition at line 23 of file Gauss2DMLE.cpp.

8.13.3.5 mappel::Gauss2DMLE::Gauss2DMLE (const ImageSizeT & *size*, const VecT & *psf_sigma*, const CompositeDist & *prior*)

Definition at line 31 of file Gauss2DMLE.cpp.

8.13.3.6 mappel::Gauss2DMLE::Gauss2DMLE (const Gauss2DMLE & *o*)

Definition at line 39 of file Gauss2DMLE.cpp.

8.13.3.7 mappel::Gauss2DMLE::Gauss2DMLE (Gauss2DMLE && *o*)

Definition at line 47 of file Gauss2DMLE.cpp.

8.13.4 Member Function Documentation

8.13.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.13.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.13.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.13.4.4 void mappel::ImageFormat2DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 80 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.13.4.5 void mappel::ImageFormat2DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 93 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.13.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.13.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.13.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.13.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.13.4.10 void mappel::ImageFormat2DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 60 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::global_max_size, and mappel::ImageFormat2DBase::global_min_size.

Referenced by mappel::ImageFormat2DBase::ImageFormat2DBase(), and mappel::ImageFormat2DBase::set_size().

8.13.4.11 Gauss1DSumModelT mappel::Gauss2DModel::debug_internal_sum_model_x ( ) const [inline], [inherited]

Definition at line 89 of file Gauss2DModel.h.

References mappel::Gauss2DModel::x_model.

8.13.4.12 Gauss1DSumModelT mappel::Gauss2DModel::debug_internal_sum_model_y ( ) const [inline], [inherited]

Definition at line 90 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::operator=(), mappel::PointEmitterModel::prior, mappel::Gauss2DModel::psf_sigma, mappel::ImageFormat2DBase::size, mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DModel::y_model.

8.13.4.13 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.14 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.15 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.13.4.16 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.17 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 106 of file ImageFormat2DBase.h.

8.13.4.18 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.13.4.19 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.13.4.20 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.13.4.21 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.13.4.22 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.13.4.23 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 79 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.13.4.24 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.25 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.13.4.26 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.27 const VecT & mappel::Gauss2DModel::get_psf_sigma ( ) const [inline], [inherited]

Definition at line 142 of file Gauss2DModel.h.

References mappel::Gauss2DModel::psf_sigma.

Referenced by mappel::Gauss2DModel::get_stats().

8.13.4.28 double mappel::Gauss2DModel::get_psf_sigma (IdxT *idx*) const [inherited]

Definition at line 132 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::DefaultPriorType, mappel::Gauss2DModel::prior_types, and mappel::Gauss2D↩ Model::psf_sigma.

8.13.4.29 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.13.4.30 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.13.4.31 const ImageFormat2DBase::ImageSizeT & mappel::ImageFormat2DBase::get_size ( ) const [inline], [inherited]

Definition at line 74 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.13.4.32 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 41 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.13.4.33 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 99 of file ImageFormat2DBase.h.

8.13.4.34 StatsT mappel::Gauss2DModel::get_stats ( ) const [inherited]

Definition at line 268 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::get_psf_sigma(), mappel::MCMCAdaptor2D::get_stats(), mappel::ImageFormat2DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.13.4.35 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.13.4.36 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.37 Gauss2DModel::StencilI mappel::Gauss2DModel::initial_theta_estimate (const ImageT & *im*) [inline], [inherited]

Fast, heuristic estimate of initial theta.

Definition at line 194 of file Gauss2DModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::PointEmitterModel::make_param().

Referenced by mappel::Gauss2DModel::initial_theta_estimate().

8.13.4.38 Gauss2DModel::StencilI mappel::Gauss2DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) [inline], [inherited]

Definition at line 201 of file Gauss2DModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::Gauss2DModel::initial_theta_estimate().

8.13.4.39 Gauss2DModel::Stencil mappel::Gauss2DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init,* const std::string & *estimator*) [inherited]

Definition at line 303 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::Stencil::bg(), mappel::methods::estimate_max(), mappel::Gauss2DModel::Stencil::I(), mappel::PointEmitterModel::lbound, mappel::Gauss2DModel::make_stencil(), mappel::PointEmitterModel::num_params, mappel::ImageFormat2DBase::size, mappel::PointEmitterModel::theta_in_bounds(), mappel::PointEmitterModel::ubound, mappel::Gauss2DModel::x_model, and mappel::Gauss2DModel::y_model.

8.13.4.40 CompositeDist mappel::Gauss2DModel::make_default_prior (const ImageSizeT & *size,* const std::string & *prior_type*) [static], [inherited]

Definition at line 150 of file Gauss2DModel.cpp.

References mappel::istarts_with(), mappel::Gauss2DModel::make_default_prior_beta_position(), and mappel::Gauss2DModel::make_default_prior_normal_position().

8.13.4.41 CompositeDist mappel::Gauss2DModel::make_default_prior_beta_position (const ImageSizeT & *size*) [static], [inherited]

Definition at line 171 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DModel::make_default_prior().

8.13.4.42 CompositeDist mappel::Gauss2DModel::make_default_prior_normal_position (const ImageSizeT & *size*) [static], [inherited]

Definition at line 182 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DModel::make_default_prior().

8.13.4.43 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::make_image ( ) const [inline], [inherited]

Definition at line 85 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.13.4.44 ImageFormat2DBase::ImageStackT mappel::ImageFormat2DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 92 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.13.4.45 Gauss2DModel::Gauss1DSumModelT mappel::Gauss2DModel::make_internal_1Dsum_estimator (IdxT *dim,* const ImageSizeT & *size,* const VecT & *psf_sigma,* const CompositeDist & *prior*) [static], [protected], [inherited]

Definition at line 62 of file Gauss2DModel.cpp.

References mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_normal_position(), mappel::Gauss2DModel::psf_sigma, and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), and mappel::Gauss2DModel::update_internal_1Dsum_estimators().

8.13.4.46 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.13.4.47 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.13.4.48 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.13.4.49 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.13.4.50 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.13.4.51 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.13.4.52 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.13.4.53 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.13.4.54 CompositeDist mappel::Gauss2DModel::make_prior_beta_position (const ImageSizeT & *size,* double *beta_xpos,* double *beta_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static], [inherited]

Definition at line 193 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), and mappel::ImageFormat2DBase::size.

8.13.4.55 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.13.4.56 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.13.4.57 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.13.4.58 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.13.4.59 CompositeDist mappel::Gauss2DModel::make_prior_normal_position (const ImageSizeT & *size,* double *sigma_xpos,* double *beta_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static], [inherited]

Definition at line 206 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::ImageFormat2DBase::size.

8.13.4.60 Gauss2DModel::Stencil mappel::Gauss2DModel::make_stencil (const ParamT & *theta,* bool *compute_derivatives* = true) const [inline], [inherited]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 131 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by mappel::Gauss2DModel::initial_theta_estimate().

8.13.4.61 Gauss2DMLE & mappel::Gauss2DMLE::operator= (const Gauss2DMLE & *o*)

Definition at line 55 of file Gauss2DMLE.cpp.

References mappel::MLEstimator::operator=(), mappel::PoissonNoise2DObjective::operator=(), mappel::Image↩Format2DBase::operator=(), mappel::Gauss2DModel::operator=(), and mappel::PointEmitterModel::operator=().

8.13.4.62 Gauss2DMLE & mappel::Gauss2DMLE::operator= (Gauss2DMLE && *o*)

Definition at line 66 of file Gauss2DMLE.cpp.

References mappel::MLEstimator::operator=(), mappel::PoissonNoise2DObjective::operator=(), mappel::Image↩Format2DBase::operator=(), mappel::Gauss2DModel::operator=(), and mappel::PointEmitterModel::operator=().

8.13.4.63 void mappel::Gauss2DModel::pixel_grad (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad*) const [inline], [inherited]

Definition at line 159 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DY, mappel::Gauss2DModel::↩Stencil::I(), mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

Referenced by mappel::Gauss2DModel::pixel_hess_update().

8.13.4.64 void mappel::Gauss2DModel::pixel_grad2 (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad2*) const [inline], [inherited]

Definition at line 170 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::↩Stencil::I(), mappel::Gauss2DModel::psf_sigma, mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::↩Stencil::Y.

8.13.4.65 void mappel::Gauss2DModel::pixel_hess (int *i,* int *j,* const Stencil & *s,* MatT & *hess*) const [inline], [inherited]

Definition at line 181 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::Stencil::DY, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::Stencil::I(), mappel::Gauss2DModel::psf_sigma, mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.13.4.66 void mappel::Gauss2DModel::pixel_hess_update (int *i,* int *j,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const [inherited]

pixel derivative inner loop calculations.

Definition at line 282 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::Stencil::DY, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::Stencil::I(), mappel::PointEmitterModel::make_param(), mappel::Gauss2DModel::pixel_grad(), mappel::Gauss2DModel::psf_sigma, mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.13.4.67 double mappel::Gauss2DModel::pixel_model_value (int *i,* int *j,* const Stencil & *s*) const [inline], [inherited]

Definition at line 152 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::bg(), mappel::Gauss2DModel::Stencil::I(), mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.13.4.68 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.13.4.69 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.13.4.70 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.71 void mappel::MCMCAdaptor2D::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 59 of file MCMCAdaptor2D.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptor2D::eta_y, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.13.4.72 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.73 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.13.4.74 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.13.4.75 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_,* const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.13.4.76 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.77 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name,* double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.78 void mappel::Gauss2DModel::set_hyperparams (const VecT & *hyperparams*) [inherited]

Definition at line 109 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::set_hyperparams(), and mappel::Gauss2DModel::update_internal_1Dsum_↩ estimators().

8.13.4.79 template<class ImT > void mappel::ImageFormat2DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 113 of file ImageFormat2DBase.h.

8.13.4.80 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = -1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩ Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.13.4.81 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.13.4.82 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩ Ds().

8.13.4.83 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩ _scale.

8.13.4.84 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.13.4.85 void mappel::Gauss2DModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 97 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::set_prior(), and mappel::Gauss2DModel::update_internal_1Dsum_↩ estimators().

8.13.4.86 void mappel::Gauss2DModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 103 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::set_prior(), and mappel::Gauss2DModel::update_internal_1Dsum_↩ estimators().

8.13.4.87 void mappel::Gauss2DModel::set_psf_sigma (double *new_psf_sigma*) [inline], [inherited]

Definition at line 146 of file Gauss2DModel.h.

8.13.4.88 void mappel::Gauss2DModel::set_psf_sigma (const VecT & *new_psf_sigma*) [inherited]

Definition at line 123 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss2DModel::psf_sigma, mappel::Gauss1D↩ Model::set_psf_sigma(), mappel::Gauss2DModel::x_model, and mappel::Gauss2DModel::y_model.

8.13.4.89 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.13.4.90 void mappel::Gauss2DModel::set_size (const ImageSizeT & *size_*) [inherited]

Definition at line 115 of file Gauss2DModel.cpp.

References mappel::ImageFormat2DBase::set_size(), mappel::ImageFormat1DBase::set_size(), mappel::Image↩ Format2DBase::size, mappel::Gauss2DModel::x_model, and mappel::Gauss2DModel::y_model.

8.13.4.91 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.13.4.92 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.13.4.93 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.13.4.94 void mappel::Gauss2DModel::update_internal_1Dsum_estimators ( ) [protected], [inherited]

Definition at line 91 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::get_prior(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::psf_sigma, mappel::ImageFormat2DBase::size, mappel::Gauss2DModel::x_model, and mappel::Gauss2DModel::y_model.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DModel::set_prior().

8.13.5 Member Data Documentation

8.13.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.13.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.13.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.13.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.13.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.13.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.13.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make↩
_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2↩
DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_↩
normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D↩
::set_background_mcmc_sampling().

8.13.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.13.5.9 const std::string mappel::Gauss2DModel::DefaultPriorType = "Normal" [static], [inherited]

Definition at line 51 of file Gauss2DModel.h.

Referenced by mappel::Gauss2DModel::get_psf_sigma().

8.13.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.13.5.11 const std::vector< std::string > mappel::PoissonNoise2DObjective::estimator_names [static], [inherited]

Definition at line 23 of file PoissonNoise2DObjective.h.

8.13.5.12 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.13.5.13 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.13.5.14 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.13.5.15 double mappel::MCMCAdaptor2D::eta_y =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_y in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor2D.h.

Referenced by mappel::MCMCAdaptor2D::get_stats(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MC↩ MCAdaptor2D::operator=(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor2D↩ ::sample_mcmc_candidate().

8.13.5.16 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.13.5.17 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.13.5.18 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.13.5.19 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_max_size =512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 39 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.13.5.20 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.13.5.21 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_min_size =3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 38 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.13.5.22 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.13.5.23 const std::string mappel::Gauss2DMLE::name [static]

Definition at line 37 of file Gauss2DMLE.h.

8.13.5.24 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::num_dim =2 [static], [inherited]

Number of image dimensions.

Definition at line 37 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.13.5.25 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.13.5.26 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.13.5.27 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.13.5.28 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.13.5.29 const StringVecT mappel::Gauss2DModel::prior_types [static], [inherited]

Initial value:

```
= { "Beta",
                                                    "Normal"
                                                  }
```

Definition at line 50 of file Gauss2DModel.h.

Referenced by mappel::Gauss2DModel::get_psf_sigma().

8.13.5.30 VecT mappel::Gauss2DModel::psf_sigma [protected], [inherited]

Standard deviation of the fixed-sigma 1D Gaussian PSF in pixels

Definition at line 104 of file Gauss2DModel.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss_heuristic_compute_estimate(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DModel::get_psf_sigma(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::operator=(), mappel::Gauss2DModel::pixel_grad2(), mappel::Gauss2DModel::pixel_hess(), mappel::Gauss2DModel::pixel_hess_update(), mappel::Gauss2DModel::set_psf_sigma(), mappel::Gauss2DModel::Stencil::Stencil(), and mappel::Gauss2DModel::update_internal_1Dsum_estimators().

8.13.5.31 double mappel::MCMCAdaptorBase::sigma_scale [protected],[inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMC↩Adaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set↩_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMC↩AdaptorBase::set_mcmc_sigma_scale().

8.13.5.32 ImageSizeT mappel::ImageFormat2DBase::size [protected],[inherited]

Number of pixels in X dimension for 1D image

Definition at line 67 of file ImageFormat2DBase.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss↩_heuristic_compute_estimate(), mappel::ImageFormat2DBase::check_image_shape(), mappel::Gauss2DModel::↩Stencil::compute_derivatives(), mappel::Gauss2DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel↩::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::methods↩::expected_information(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsMAP::Gauss2DsMA↩P(), mappel::Gauss2DsMLE::Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Image↩Format2DBase::get_num_pixels(), mappel::ImageFormat2DBase::get_size(), mappel::ImageFormat2DBase::get↩_stats(), mappel::methods::likelihood::grad(), mappel::methods::likelihood::grad2(), mappel::methods::likelihood↩::debug::grad_components(), mappel::methods::likelihood::hessian(), mappel::methods::likelihood::debug::hessian↩_components(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), mappel::Gauss2DModel↩::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::↩Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal↩_position(), mappel::ImageFormat2DBase::make_image(), mappel::ImageFormat2DBase::make_image_stack(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::make_internal_1Dsum_↩estimator(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_↩position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss2DsModel::make_prior_normal↩_position(), mappel::methods::model_image(), mappel::ImageFormat2DBase::operator=(), mappel::methods↩::likelihood::rllh(), mappel::methods::likelihood::debug::rllh_components(), mappel::ImageFormat2DBase::set_↩size(), mappel::Gauss2DModel::set_size(), mappel::Gauss2DsModel::set_size(), mappel::methods::simulate_image(), mappel::methods::simulate_image_from_model(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss2Ds↩Model::Stencil::Stencil(), mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2Ds↩Model::update_internal_1Dsum_estimators().

8.13.5.33 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel↩::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta↩_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel↩::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::Point↩EmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.13.5.34 Gauss1DSumModelT mappel::Gauss2DModel::x_model [protected], [inherited]

X-model fits 2D images X-axis (column sum)

Definition at line 105 of file Gauss2DModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_x(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DModel::operator=(), mappel::Gauss2DModel::set_psf_sigma(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DModel::update_internal_1Dsum_estimators().

8.13.5.35 Gauss1DSumModelT mappel::Gauss2DModel::y_model [protected], [inherited]

Y-model fits 2D images Y-axis (row sum)

Definition at line 106 of file Gauss2DModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DModel::operator=(), mappel::Gauss2DModel::set_psf_sigma(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DModel::update_internal_1Dsum_estimators().

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

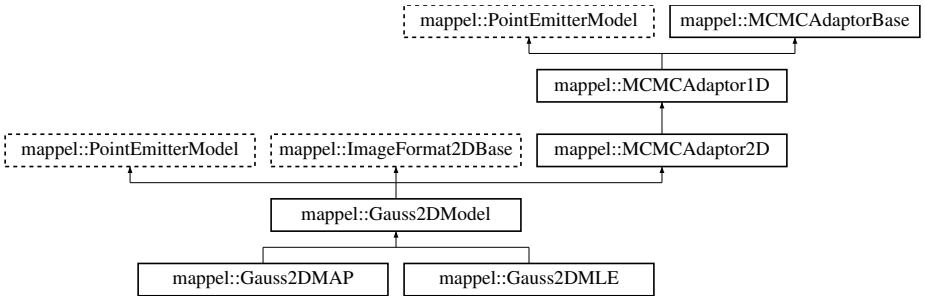
- Gauss2DMLE.h
- Gauss2DMLE.cpp

8.14 mappel::Gauss2DModel Class Reference

A base class for 2D Gaussian PSF with fixed but possibly asymmetric sigma.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DModel.h>`

Inheritance diagram for mappel::Gauss2DModel:



Classes

- class Stencil

  Stencil for 2D fixed-sigma models.

Public Types

- using Gauss1DSumModelT = Gauss1DMAP
- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = arma::Col< CoordT >
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Mat< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Mat< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Cube< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >

Public Member Functions

- void set_hyperparams (const VecT &hyperparams)
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- void set_size (const ImageSizeT &size_)
- const VecT & get_psf_sigma () const
- double get_psf_sigma (IdxT idx) const
- void set_psf_sigma (double new_psf_sigma)
- void set_psf_sigma (const VecT &new_psf_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (int i, int j, const Stencil &s) const
- void pixel_grad (int i, int j, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (int i, int j, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (int i, int j, const Stencil &s, MatT &hess) const
- void pixel_hess_update (int i, int j, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im)

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init)
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init, const std::string &estimator)
- Gauss1DSumModelT debug_internal_sum_model_x () const
- Gauss1DSumModelT debug_internal_sum_model_y () const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const

- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- IdxT get_num_hyperparams () const
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- const ImageSizeT & get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const

- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (const ImageSizeT &size, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (const ImageSizeT &size)
- static CompositeDist make_default_prior_normal_position (const ImageSizeT &size)
- static CompositeDist make_prior_beta_position (const ImageSizeT &size, double beta_xpos, double beta_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static CompositeDist make_prior_normal_position (const ImageSizeT &size, double sigma_xpos, double beta_↩ ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim =2
- static const ImageCoordT global_min_size =3
- static const ImageCoordT global_max_size =512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5

Protected Member Functions

- Gauss2DModel (const ImageSizeT &size, const VecT &psf_sigma)
- Gauss2DModel (const Gauss2DModel &o)
- Gauss2DModel (Gauss2DModel &&o)
- Gauss2DModel & operator= (const Gauss2DModel &o)
- Gauss2DModel & operator= (Gauss2DModel &&o)
- void update_internal_1Dsum_estimators ()
- void set_mcmc_num_phases (IdxT num_phases)

Static Protected Member Functions

- static Gauss1DSumModelT make_internal_1Dsum_estimator (IdxT dim, const ImageSizeT &size, const VecT &psf_sigma, const CompositeDist &prior)

Protected Attributes

- VecT psf_sigma
- Gauss1DSumModelT x_model
- Gauss1DSumModelT y_model
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_y =0
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.14.1 Detailed Description

A base class for 2D Gaussian PSF with fixed but possibly asymmetric sigma.

Definition at line 20 of file Gauss2DModel.h.

8.14.2 Member Typedef Documentation

8.14.2.1 using mappel::Gauss2DModel::Gauss1DSumModelT = Gauss1DMAP

Definition at line 23 of file Gauss2DModel.h.

8.14.2.2 using mappel::ImageFormat2DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 24 of file ImageFormat2DBase.h.

8.14.2.3 using mappel::ImageFormat2DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 25 of file ImageFormat2DBase.h.

8.14.2.4 template<class PixelT > using mappel::ImageFormat2DBase::ImageShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 32 of file ImageFormat2DBase.h.

8.14.2.5 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a single image's coordinates

Definition at line 27 of file ImageFormat2DBase.h.

8.14.2.6 using mappel::ImageFormat2DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 29 of file ImageFormat2DBase.h.

8.14.2.7 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeVecShapeT = arma::Mat<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 28 of file ImageFormat2DBase.h.

8.14.2.8 using mappel::ImageFormat2DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 30 of file ImageFormat2DBase.h.

8.14.2.9 template<class PixelT > using mappel::ImageFormat2DBase::ImageStackShapeT = arma::Cube<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 33 of file ImageFormat2DBase.h.

8.14.2.10 using mappel::ImageFormat2DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 35 of file ImageFormat2DBase.h.

8.14.2.11 using mappel::ImageFormat2DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 34 of file ImageFormat2DBase.h.

8.14.2.12 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.14.2.13 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.14.2.14 using mappel::Gauss2DModel::StencilVecT = std::vector<Stencil>

Definition at line 47 of file Gauss2DModel.h.

8.14.3 Constructor & Destructor Documentation

8.14.3.1 mappel::Gauss2DModel::Gauss2DModel (const ImageSizeT & *size,* const VecT & *psf_sigma*) [protected]

Definition at line 12 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), make_internal_1Dsum_estimator(), mappel::PointEmitterModel::prior, psf_sigma, mappel::ImageFormat2DBase::size, and y_model.

Referenced by debug_internal_sum_model_y().

8.14.3.2 mappel::Gauss2DModel::Gauss2DModel (const Gauss2DModel & *o*) [protected]

Definition at line 22 of file Gauss2DModel.cpp.

References make_internal_1Dsum_estimator(), mappel::PointEmitterModel::prior, psf_sigma, mappel::Image↩Format2DBase::size, and y_model.

8.14.3.3 mappel::Gauss2DModel::Gauss2DModel (Gauss2DModel && *o*) [protected]

Definition at line 30 of file Gauss2DModel.cpp.

References make_internal_1Dsum_estimator(), mappel::PointEmitterModel::prior, psf_sigma, mappel::Image↩Format2DBase::size, and y_model.

8.14.4 Member Function Documentation

8.14.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.14.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.14.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.14.4.4 void mappel::ImageFormat2DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 80 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.14.4.5 void mappel::ImageFormat2DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 93 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.14.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.14.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.14.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and set_psf_sigma().

8.14.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.14.4.10 void mappel::ImageFormat2DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 60 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::global_max_size, and mappel::ImageFormat2DBase::global_min_size.

Referenced by mappel::ImageFormat2DBase::ImageFormat2DBase(), and mappel::ImageFormat2DBase::set_size().

8.14.4.11 Gauss1DSumModelT mappel::Gauss2DModel::debug_internal_sum_model_x ( ) const [inline]

Definition at line 89 of file Gauss2DModel.h.

References x_model.

8.14.4.12 Gauss1DSumModelT mappel::Gauss2DModel::debug_internal_sum_model_y ( ) const [inline]

Definition at line 90 of file Gauss2DModel.h.

References Gauss2DModel(), make_internal_1Dsum_estimator(), operator=(), mappel::PointEmitterModel::prior, psf↩_sigma, mappel::ImageFormat2DBase::size, update_internal_1Dsum_estimators(), and y_model.

8.14.4.13 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.14 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.15 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩intensity_mcmc_sampling().

8.14.4.16 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.17 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 106 of file ImageFormat2DBase.h.

8.14.4.18 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.14.4.19 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.14.4.20 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.14.4.21 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.14.4.22 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.14.4.23 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 79 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.14.4.24 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.25 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_↩ estimators().

8.14.4.26 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.27 const VecT & mappel::Gauss2DModel::get_psf_sigma ( ) const [inline]

Definition at line 142 of file Gauss2DModel.h.

References psf_sigma.

Referenced by get_stats().

8.14.4.28 double mappel::Gauss2DModel::get_psf_sigma (IdxT *idx*) const

Definition at line 132 of file Gauss2DModel.cpp.

References DefaultPriorType, prior_types, and psf_sigma.

8.14.4.29 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.14.4.30 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.14.4.31 const ImageFormat2DBase::ImageSizeT & mappel::ImageFormat2DBase::get_size ( ) const [inline], [inherited]

Definition at line 74 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.14.4.32 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 41 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.14.4.33 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 99 of file ImageFormat2DBase.h.

8.14.4.34 StatsT mappel::Gauss2DModel::get_stats ( ) const

Definition at line 268 of file Gauss2DModel.cpp.

References get_psf_sigma(), mappel::MCMCAdaptor2D::get_stats(), mappel::ImageFormat2DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.14.4.35 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMC↩Adaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.14.4.36 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.37 Gauss2DModel::StencilI mappel::Gauss2DModel::initial_theta_estimate (const ImageT & *im*) [inline]

Fast, heuristic estimate of initial theta.

Definition at line 194 of file Gauss2DModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::PointEmitterModel::make_↩param().

Referenced by initial_theta_estimate().

8.14.4.38 Gauss2DModel::StencilI mappel::Gauss2DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) [inline]

Definition at line 201 of file Gauss2DModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and initial_theta_estimate().

8.14.4.39 Gauss2DModel::StencilI mappel::Gauss2DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init,* const std::string & *estimator*)

Definition at line 303 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::Stencil::bg(), mappel::methods::estimate_max(), mappel::Gauss2DModel::Stencil::I(), mappel::PointEmitterModel::lbound, make_stencil(), mappel::PointEmitterModel::num_params, mappel::ImageFormat2DBase::size, mappel::PointEmitterModel::theta_in_bounds(), mappel::PointEmitterModel::ubound, x_model, and y_model.

8.14.4.40 CompositeDist mappel::Gauss2DModel::make_default_prior (const ImageSizeT & *size,* const std::string & *prior_type*) [static]

Definition at line 150 of file Gauss2DModel.cpp.

References mappel::istarts_with(), make_default_prior_beta_position(), and make_default_prior_normal_position().

8.14.4.41 CompositeDist mappel::Gauss2DModel::make_default_prior_beta_position (const ImageSizeT & *size*) [static]

Definition at line 171 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), and mappel::ImageFormat2DBase::size.

Referenced by make_default_prior().

8.14.4.42 CompositeDist mappel::Gauss2DModel::make_default_prior_normal_position (const ImageSizeT & *size*) [static]

Definition at line 182 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::ImageFormat2DBase::size.

Referenced by make_default_prior().

8.14.4.43 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::make_image ( ) const [inline], [inherited]

Definition at line 85 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.14.4.44 ImageFormat2DBase::ImageStackT mappel::ImageFormat2DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 92 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.14.4.45 Gauss2DModel::Gauss1DSumModelT mappel::Gauss2DModel::make_internal_1Dsum_estimator (IdxT *dim,* const ImageSizeT & *size,* const VecT & *psf_sigma,* const CompositeDist & *prior*) [static], [protected]

Definition at line 62 of file Gauss2DModel.cpp.

References mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_normal_↩position(), psf_sigma, and mappel::ImageFormat2DBase::size.

Referenced by debug_internal_sum_model_y(), Gauss2DModel(), and update_internal_1Dsum_estimators().

8.14.4.46 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta↩_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), pixel_↩hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.14.4.47 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.14.4.48 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.14.4.49 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.14.4.50 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.14.4.51 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.14.4.52 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.14.4.53 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.14.4.54 CompositeDist mappel::Gauss2DModel::make_prior_beta_position (const ImageSizeT & *size*, double *beta_xpos*, double *beta_ypos*, double *mean_I*, double *kappa_I*, double *mean_bg*, double *kappa_bg*) [static]

Definition at line 193 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), and mappel::ImageFormat2DBase::size.

8.14.4.55 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.14.4.56 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.14.4.57 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.14.4.58 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.14.4.59 CompositeDist mappel::Gauss2DModel::make_prior_normal_position (const ImageSizeT & *size,* double *sigma_xpos,* double *beta_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static]

Definition at line 206 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), and mappel::ImageFormat2DBase::size.

8.14.4.60 Gauss2DModel::Stencil mappel::Gauss2DModel::make_stencil (const ParamT & *theta,* bool *compute_derivatives* = true) const [inline]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 131 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by initial_theta_estimate().

8.14.4.61 Gauss2DModel & mappel::Gauss2DModel::operator= (const Gauss2DModel & *o*) [protected]

Definition at line 38 of file Gauss2DModel.cpp.

References mappel::MCMCAdaptor2D::operator=(), psf_sigma, x_model, and y_model.

Referenced by debug_internal_sum_model_y(), mappel::Gauss2DMAP::operator=(), and mappel::Gauss2DMLE::operator=().

8.14.4.62 Gauss2DModel & mappel::Gauss2DModel::operator= (Gauss2DModel && *o*) [protected]

Definition at line 49 of file Gauss2DModel.cpp.

References mappel::MCMCAdaptor2D::operator=(), psf_sigma, x_model, and y_model.

8.14.4.63 void mappel::Gauss2DModel::pixel_grad (int *i*, int *j*, const Stencil & *s*, ParamT & *pgrad*) const [inline]

Definition at line 159 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DY, mappel::Gauss2DModel::Stencil::I(), mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

Referenced by pixel_hess_update().

8.14.4.64 void mappel::Gauss2DModel::pixel_grad2 (int *i*, int *j*, const Stencil & *s*, ParamT & *pgrad2*) const [inline]

Definition at line 170 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::Stencil::I(), psf_sigma, mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.14.4.65 void mappel::Gauss2DModel::pixel_hess (int *i,* int *j,* const Stencil & *s,* MatT & *hess*) const [inline]

Definition at line 181 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::↩ Stencil::DY, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::Stencil::I(), psf_sigma, mappel::Gauss2↩ DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.14.4.66 void mappel::Gauss2DModel::pixel_hess_update (int *i,* int *j,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const

pixel derivative inner loop calculations.

Definition at line 282 of file Gauss2DModel.cpp.

References mappel::Gauss2DModel::Stencil::DX, mappel::Gauss2DModel::Stencil::DXS, mappel::Gauss2DModel::↩ Stencil::DY, mappel::Gauss2DModel::Stencil::DYS, mappel::Gauss2DModel::Stencil::I(), mappel::PointEmitterModel↩ ::make_param(), pixel_grad(), psf_sigma, mappel::Gauss2DModel::Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.14.4.67 double mappel::Gauss2DModel::pixel_model_value (int *i,* int *j,* const Stencil & *s*) const [inline]

Definition at line 152 of file Gauss2DModel.h.

References mappel::Gauss2DModel::Stencil::bg(), mappel::Gauss2DModel::Stencil::I(), mappel::Gauss2DModel::↩ Stencil::X, and mappel::Gauss2DModel::Stencil::Y.

8.14.4.68 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩ EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.14.4.69 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.14.4.70 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.71 void mappel::MCMCAdaptor2D::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 59 of file MCMCAdaptor2D.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptor2D::eta_y, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.14.4.72 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.73 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.14.4.74 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.14.4.75 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_,* const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.14.4.76 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.77 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name,* double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.78 void mappel::Gauss2DModel::set_hyperparams (const VecT & *hyperparams*)

Definition at line 109 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::set_hyperparams(), and update_internal_1Dsum_estimators().

8.14.4.79 template<class ImT > void mappel::ImageFormat2DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 113 of file ImageFormat2DBase.h.

8.14.4.80 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = -1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitterModel::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.14.4.81 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.14.4.82 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.14.4.83 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma_scale.

8.14.4.84 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.14.4.85 void mappel::Gauss2DModel::set_prior (CompositeDist && *prior_*)

Definition at line 97 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::set_prior(), and update_internal_1Dsum_estimators().

8.14.4.86 void mappel::Gauss2DModel::set_prior (const CompositeDist & *prior_*)

Definition at line 103 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::set_prior(), and update_internal_1Dsum_estimators().

8.14.4.87 void mappel::Gauss2DModel::set_psf_sigma (double *new_psf_sigma*) [inline]

Definition at line 146 of file Gauss2DModel.h.

8.14.4.88 void mappel::Gauss2DModel::set_psf_sigma (const VecT & *new_psf_sigma*)

Definition at line 123 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), psf_sigma, mappel::Gauss1DModel::set_psf_sigma(), x↩
_model, and y_model.

8.14.4.89 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.14.4.90 void mappel::Gauss2DModel::set_size (const ImageSizeT & *size_*)

Definition at line 115 of file Gauss2DModel.cpp.

References mappel::ImageFormat2DBase::set_size(), mappel::ImageFormat1DBase::set_size(), mappel::Image↩
Format2DBase::size, x_model, and y_model.

8.14.4.91 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩
Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.14.4.92 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.14.4.93 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.14.4.94 void mappel::Gauss2DModel::update_internal_1Dsum_estimators ( ) [protected]

Definition at line 91 of file Gauss2DModel.cpp.

References mappel::PointEmitterModel::get_prior(), make_internal_1Dsum_estimator(), psf_sigma, mappel::ImageFormat2DBase::size, x_model, and y_model.

Referenced by debug_internal_sum_model_y(), set_hyperparams(), and set_prior().

8.14.5 Member Data Documentation

8.14.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.14.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.14.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.14.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.14.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.14.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.14.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.14.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.14.5.9 const std::string mappel::Gauss2DModel::DefaultPriorType = "Normal" [static]

Definition at line 51 of file Gauss2DModel.h.

Referenced by get_psf_sigma().

8.14.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2Ds↩ Model::initial_theta_estimate().

8.14.5.11 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D↩ ::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.14.5.12 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D↩ ::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.14.5.13 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1↩ D::sample_mcmc_candidate().

8.14.5.14 double mappel::MCMCAdaptor2D::eta_y =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_y in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor2D.h.

Referenced by mappel::MCMCAdaptor2D::get_stats(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MC↩ MCAdaptor2D::operator=(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor2D↩ ::sample_mcmc_candidate().

8.14.5.15 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.14.5.16 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.14.5.17 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.14.5.18 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_max_size =512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 39 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.14.5.19 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.14.5.20 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_min_size =3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 38 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.14.5.21 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.14.5.22 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::num_dim =2 [static], [inherited]

Number of image dimensions.

Definition at line 37 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.14.5.23 IdxT mappel::PointEmitterModel::num_hyperparams [protected],[inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.14.5.24 IdxT mappel::PointEmitterModel::num_params [protected],[inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.14.5.25 IdxT mappel::MCMCAdaptorBase::num_phases [protected],[inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.14.5.26 CompositeDist mappel::PointEmitterModel::prior [protected],[inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), Gauss2↩DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel↩::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get↩_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel↩::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel↩::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel↩::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set↩_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::↩Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel↩::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.14.5.27 const StringVecT mappel::Gauss2DModel::prior_types [static]

Initial value:

```
= { "Beta",
                                                  "Normal"
                                                }
```

Definition at line 50 of file Gauss2DModel.h.

Referenced by get_psf_sigma().

8.14.5.28 VecT mappel::Gauss2DModel::psf_sigma [protected]

Standard deviation of the fixed-sigma 1D Gaussian PSF in pixels

Definition at line 104 of file Gauss2DModel.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss_↩heuristic_compute_estimate(), mappel::Gauss2DModel::Stencil::compute_derivatives(), debug_internal_sum_model↩_y(), Gauss2DModel(), get_psf_sigma(), make_internal_1Dsum_estimator(), operator=(), pixel_grad2(), pixel_hess(), pixel_hess_update(), set_psf_sigma(), mappel::Gauss2DModel::Stencil::Stencil(), and update_internal_1Dsum_↩estimators().

8.14.5.29 double mappel::MCMCAdaptorBase::sigma_scale [protected],[inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMC↩Adaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set↩_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMC↩AdaptorBase::set_mcmc_sigma_scale().

8.14.5.30 ImageSizeT mappel::ImageFormat2DBase::size [protected],[inherited]

Number of pixels in X dimension for 1D image

Definition at line 67 of file ImageFormat2DBase.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss_heuristic_compute_estimate(), mappel::ImageFormat2DBase::check_image_shape(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss2DsModel::Stencil::compute_derivatives(), debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::methods::expected_information(), Gauss2DModel(), mappel::Gauss2DsMAP::Gauss2DsMAP(), mappel::Gauss2DsMLE::Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::ImageFormat2DBase::get_num_pixels(), mappel::ImageFormat2DBase::get_size(), mappel::ImageFormat2DBase::get_stats(), mappel::methods::likelihood::grad(), mappel::methods::likelihood::grad2(), mappel::methods::likelihood::debug::grad_components(), mappel::methods::likelihood::hessian(), mappel::methods::likelihood::debug::hessian_components(), initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::ImageFormat2DBase::make_image(), mappel::ImageFormat2DBase::make_image_stack(), make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::make_internal_1Dsum_estimator(), make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), make_prior_normal_position(), mappel::Gauss2DsModel::make_prior_normal_position(), mappel::methods::model_image(), mappel::ImageFormat2DBase::operator=(), mappel::methods::likelihood::rllh(), mappel::methods::likelihood::debug::rllh_components(), mappel::ImageFormat2DBase::set_size(), set_size(), mappel::Gauss2DsModel::set_size(), mappel::methods::simulate_image(), mappel::methods::simulate_image_from_model(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss2DsModel::Stencil::Stencil(), update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.14.5.31 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.14.5.32 Gauss1DSumModelT mappel::Gauss2DModel::x_model [protected]

X-model fits 2D images X-axis (column sum)

Definition at line 105 of file Gauss2DModel.h.

Referenced by debug_internal_sum_model_x(), initial_theta_estimate(), operator=(), set_psf_sigma(), set_size(), and update_internal_1Dsum_estimators().

8.14.5.33 Gauss1DSumModelT mappel::Gauss2DModel::y_model [protected]

Y-model fits 2D images Y-axis (row sum)

Definition at line 106 of file Gauss2DModel.h.

Referenced by debug_internal_sum_model_y(), Gauss2DModel(), initial_theta_estimate(), operator=(), set_psf_↩ sigma(), set_size(), and update_internal_1Dsum_estimators().

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

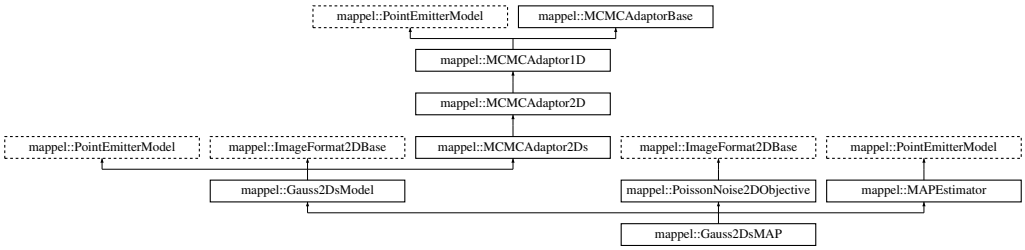
- Gauss2DModel.h
- Gauss2DModel.cpp

8.15 mappel::Gauss2DsMAP Class Reference

A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum a-posteriori objective.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DsMAP.h>`

Inheritance diagram for mappel::Gauss2DsMAP:



Public Types

- using Gauss1DSumModelT = Gauss1DsMAP
- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = arma::Col< CoordT >
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Mat< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Mat< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Cube< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >
- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT

Public Member Functions

- Gauss2DsMAP (const ImageSizeT &size, const VecT &min_sigma, double max_sigma_ratio, const std::string &prior_type=DefaultPriorType)
- Gauss2DsMAP (const ImageSizeT &size, const VecT &min_sigma, const VecT &max_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss2DsMAP (const ImageSizeT &size, const VecT &min_sigma, CompositeDist &&prior)
- Gauss2DsMAP (const ImageSizeT &size, const VecT &min_sigma, const CompositeDist &prior)
- Gauss2DsMAP (const Gauss2DsMAP &o)
- Gauss2DsMAP & operator= (const Gauss2DsMAP &o)
- Gauss2DsMAP (Gauss2DsMAP &&o)
- Gauss2DsMAP & operator= (Gauss2DsMAP &&o)
- void set_hyperparams (const VecT &hyperparams)
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- void set_size (const ImageSizeT &size_)
- VecT get_min_sigma () const
- double get_min_sigma (IdxT dim) const
- VecT get_max_sigma () const
- double get_max_sigma (IdxT dim) const
- double get_max_sigma_ratio () const
- void set_min_sigma (const VecT &min_sigma)
- void set_max_sigma (const VecT &max_sigma)
- void set_max_sigma_ratio (double max_sigma_ratio)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (int i, int j, const Stencil &s) const
- void pixel_grad (int i, int j, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (int i, int j, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (int i, int j, const Stencil &s, MatT &hess) const
- void pixel_hess_update (int i, int j, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im)

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init)
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init, const std::string &estimator)
- Gauss1DSumModelT debug_internal_sum_model_x () const
- Gauss1DSumModelT debug_internal_sum_model_y () const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const

- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- IdxT get_num_hyperparams () const
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- const ImageSizeT & get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (const ImageSizeT &size, double max_sigma_ratio, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (const ImageSizeT &size, double max_sigma_ratio)
- static CompositeDist make_default_prior_normal_position (const ImageSizeT &size, double max_sigma_ratio)
- static CompositeDist make_prior_beta_position (const ImageSizeT &size, double beta_xpos, double beta_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double max_sigma_ratio, double alpha_sigma)
- static CompositeDist make_prior_normal_position (const ImageSizeT &size, double sigma_xpos, double sigma_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double max_sigma_ratio, double alpha_sigma)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string name
- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim =2
- static const ImageCoordT global_min_size =3
- static const ImageCoordT global_max_size =512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5
- static const std::vector< std::string > estimator_names

Protected Member Functions

- void update_internal_1Dsum_estimators ()
- void set_mcmc_num_phases (IdxT num_phases)

Static Protected Member Functions

- static Gauss1DSumModelT make_internal_1Dsum_estimator (IdxT dim, const ImageSizeT &size, const VecT &min_sigma, const VecT &max_sigma, const CompositeDist &prior)
- static double compute_max_sigma_ratio (const VecT &min_sigma, const VecT &max_sigma)

Protected Attributes

- VecT min_sigma
- Gauss1DSumModelT x_model
- Gauss1DSumModelT y_model
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_sigma =0
- double eta_y =0
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.15.1 Detailed Description

A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum a-posteriori objective.

Model: Gauss2DsModel - 2D Gaussian variable scalar PSF sigma Objective: PoissonNoise2DObjective - Poisson noise model for 2D Estimator: MAPEstimator - Maximum a-posteriori estimator

Definition at line 24 of file Gauss2DsMAP.h.

8.15.2 Member Typedef Documentation

8.15.2.1 using mappel::Gauss2DsModel::Gauss1DSumModelT = Gauss1DsMAP [inherited]

Definition at line 26 of file Gauss2DsModel.h.

8.15.2.2 using mappel::ImageFormat2DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 24 of file ImageFormat2DBase.h.

8.15.2.3 using mappel::ImageFormat2DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 25 of file ImageFormat2DBase.h.

8.15.2.4 template<class PixelT > using mappel::ImageFormat2DBase::ImageShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 32 of file ImageFormat2DBase.h.

8.15.2.5 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a single image's coordinates

Definition at line 27 of file ImageFormat2DBase.h.

8.15.2.6 using mappel::ImageFormat2DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 29 of file ImageFormat2DBase.h.

8.15.2.7 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeVecShapeT = arma::Mat<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 28 of file ImageFormat2DBase.h.

8.15.2.8 using mappel::ImageFormat2DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 30 of file ImageFormat2DBase.h.

8.15.2.9 template<class PixelT > using mappel::ImageFormat2DBase::ImageStackShapeT = arma::Cube<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 33 of file ImageFormat2DBase.h.

8.15.2.10 using mappel::ImageFormat2DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 35 of file ImageFormat2DBase.h.

8.15.2.11 using mappel::ImageFormat2DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 34 of file ImageFormat2DBase.h.

8.15.2.12 using mappel::PoissonNoise2DObjective::ModelDataStackT = ImageStackT [inherited]

Objective function data stack type: 2D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise2DObjective.h.

8.15.2.13 using mappel::PoissonNoise2DObjective::ModelDataT = ImageT [inherited]

Objective function data type: 2D double precision image, gain-corrected to approximate photons counts

Definition at line 24 of file PoissonNoise2DObjective.h.

8.15.2.14 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.15.2.15 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.15.2.16 using mappel::Gauss2DsModel::StencilVecT = std::vector<Stencil> [inherited]

Definition at line 55 of file Gauss2DsModel.h.

8.15.3 Constructor & Destructor Documentation

8.15.3.1 mappel::Gauss2DsMAP::Gauss2DsMAP (const ImageSizeT & *size,* const VecT & *min_sigma,* double *max_sigma_ratio,* const std::string & *prior_type* = DefaultPriorType)

Definition at line 11 of file Gauss2DsMAP.cpp.

References mappel::Gauss2DsModel::min_sigma, and mappel::ImageFormat2DBase::size.

8.15.3.2 mappel::Gauss2DsMAP::Gauss2DsMAP (const ImageSizeT & *size,* const VecT & *min_sigma,* const VecT & *max_sigma,* const std::string & *prior_type* = DefaultPriorType)

Definition at line 15 of file Gauss2DsMAP.cpp.

References mappel::Gauss2DsModel::compute_max_sigma_ratio(), mappel::Gauss2DsModel::make_default_prior(), mappel::Gauss2DsModel::min_sigma, and mappel::ImageFormat2DBase::size.

8.15.3.3 mappel::Gauss2DsMAP::Gauss2DsMAP (const ImageSizeT & *size,* const VecT & *min_sigma,* CompositeDist && *prior*)

Definition at line 19 of file Gauss2DsMAP.cpp.

8.15.3.4 mappel::Gauss2DsMAP::Gauss2DsMAP (const ImageSizeT & *size,* const VecT & *min_sigma,* const CompositeDist & *prior*)

Definition at line 27 of file Gauss2DsMAP.cpp.

8.15.3.5 mappel::Gauss2DsMAP::Gauss2DsMAP (const Gauss2DsMAP & *o*)

Definition at line 35 of file Gauss2DsMAP.cpp.

8.15.3.6 mappel::Gauss2DsMAP::Gauss2DsMAP (Gauss2DsMAP && *o*)

Definition at line 43 of file Gauss2DsMAP.cpp.

8.15.4 Member Function Documentation

8.15.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.15.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.15.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.15.4.4 void mappel::ImageFormat2DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 80 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.15.4.5 void mappel::ImageFormat2DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 93 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.15.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.15.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.15.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::↩ Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_↩ max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::↩ Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.15.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

8.15.4.10 void mappel::ImageFormat2DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 60 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::global_max_size, and mappel::ImageFormat2DBase::global_min_size.

Referenced by mappel::ImageFormat2DBase::ImageFormat2DBase(), and mappel::ImageFormat2DBase::set_size().

8.15.4.11 double mappel::Gauss2DsModel::compute_max_sigma_ratio (const VecT & *min_sigma,* const VecT & *max_sigma*) [static], [protected], [inherited]

Definition at line 162 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::min_sigma.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_y(), Gauss2DsMAP(), mappel::Gauss2DsML↩ E::Gauss2DsMLE(), and mappel::Gauss2DsModel::set_max_sigma().

8.15.4.12 Gauss1DSumModelT mappel::Gauss2DsModel::debug_internal_sum_model_x ( ) const [inline], [inherited]

Definition at line 104 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::x_model.

8.15.4.13 Gauss1DSumModelT mappel::Gauss2DsModel::debug_internal_sum_model_y ( ) const [inline], [inherited]

Definition at line 105 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::compute_max_sigma_ratio(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss2DsModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::min_sigma, mappel::↩ Gauss2DsModel::operator=(), mappel::PointEmitterModel::prior, mappel::ImageFormat2DBase::size, mappel::↩ Gauss2DsModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::y_model.

8.15.4.14 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.15 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.16 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.15.4.17 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.18 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 106 of file ImageFormat2DBase.h.

8.15.4.19 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.15.4.20 VecT mappel::Gauss2DsModel::get_max_sigma ( ) const [inline], [inherited]

Definition at line 132 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::get_max_sigma_ratio(), and mappel::Gauss2DsModel::get_min_sigma().

Referenced by mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss2DsModel::get_stats(), mappel::Gauss2↩DsModel::operator=(), mappel::Gauss2DsModel::set_max_sigma_ratio(), mappel::Gauss2DsModel::set_min_sigma(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.15.4.21 double mappel::Gauss2DsModel::get_max_sigma (IdxT *dim*) const [inline], [inherited]

Definition at line 136 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::get_max_sigma_ratio(), and mappel::Gauss2DsModel::get_min_sigma().

8.15.4.22 double mappel::Gauss2DsModel::get_max_sigma_ratio ( ) const [inline], [inherited]

Definition at line 140 of file Gauss2DsModel.h.

References mappel::PointEmitterModel::get_ubound().

Referenced by mappel::Gauss2DsModel::get_max_sigma(), and mappel::Gauss2DsModel::get_stats().

8.15.4.23 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.15.4.24 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.15.4.25 VecT mappel::Gauss2DsModel::get_min_sigma ( ) const [inline], [inherited]

Definition at line 128 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::min_sigma.

Referenced by mappel::Gauss2DsModel::get_max_sigma(), mappel::Gauss2DsModel::get_stats(), and mappel::↩Gauss2DsModel::set_max_sigma().

8.15.4.26 double mappel::Gauss2DsModel::get_min_sigma (IdxT *dim*) const [inherited]

Definition at line 191 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::DefaultPriorType, mappel::Gauss2DsModel::min_sigma, and mappel::Gauss2↩DsModel::prior_types.

8.15.4.27 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.15.4.28 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.15.4.29 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 79 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.15.4.30 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.31 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.15.4.32 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.33 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.15.4.34 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.15.4.35 const ImageFormat2DBase::ImageSizeT & mappel::ImageFormat2DBase::get_size ( ) const [inline], [inherited]

Definition at line 74 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.15.4.36 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 41 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.15.4.37 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 99 of file ImageFormat2DBase.h.

8.15.4.38 StatsT mappel::Gauss2DsModel::get_stats ( ) const [inherited]

Definition at line 341 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::get_max_sigma(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_min_sigma(), mappel::MCMCAdaptor2Ds::get_stats(), mappel::ImageFormat2DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.15.4.39 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.15.4.40 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.41 Gauss2DsModel::StencilI mappel::Gauss2DsModel::initial_theta_estimate (const ImageT & *im*) [inline], [inherited]

Fast, heuristic estimate of initial theta.

Definition at line 224 of file Gauss2DsModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::PointEmitterModel::make_↩ param().

Referenced by mappel::Gauss2DsModel::initial_theta_estimate().

8.15.4.42 Gauss2DsModel::StencilI mappel::Gauss2DsModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) [inline], [inherited]

Definition at line 231 of file Gauss2DsModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::Gauss2DsModel::initial_theta_↩ estimate().

8.15.4.43 Gauss2DsModel::StencilI mappel::Gauss2DsModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init,* const std::string & *estimator*) [inherited]

Definition at line 385 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::Stencil::bg(), mappel::methods::estimate_max(), mappel::Gauss2DsModel::↩ Stencil::I(), mappel::PointEmitterModel::lbound, mappel::Gauss2DsModel::make_stencil(), mappel::Gauss2DsModel↩ ::min_sigma, mappel::PointEmitterModel::num_params, mappel::Gauss2DsModel::Stencil::sigma_ratio(), mappel↩ ::ImageFormat2DBase::size, mappel::PointEmitterModel::theta_in_bounds(), mappel::PointEmitterModel::ubound, mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

8.15.4.44 CompositeDist mappel::Gauss2DsModel::make_default_prior (const ImageSizeT & *size,* double *max_sigma_ratio,* const std::string & *prior_type*) [static], [inherited]

Definition at line 208 of file Gauss2DsModel.cpp.

References mappel::istarts_with(), mappel::Gauss2DsModel::make_default_prior_beta_position(), and mappel::↩ Gauss2DsModel::make_default_prior_normal_position().

Referenced by Gauss2DsMAP(), and mappel::Gauss2DsMLE::Gauss2DsMLE().

8.15.4.45 CompositeDist mappel::Gauss2DsModel::make_default_prior_beta_position (const ImageSizeT & *size,* double *max_sigma_ratio*) [static], [inherited]

Definition at line 230 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩ _intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), mappel::PointEmitterModel::make↩ _prior_component_sigma(), and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DsModel::make_default_prior().

8.15.4.46 CompositeDist mappel::Gauss2DsModel::make_default_prior_normal_position (const ImageSizeT & *size,* double *max_sigma_ratio*) [static],[inherited]

Definition at line 243 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DsModel::make_default_prior().

8.15.4.47 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::make_image ( ) const [inline], [inherited]

Definition at line 85 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.15.4.48 ImageFormat2DBase::ImageStackT mappel::ImageFormat2DBase::make_image_stack (ImageCoordT *n*) const [inline],[inherited]

Definition at line 92 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.15.4.49 Gauss2DsModel::Gauss1DSumModelT mappel::Gauss2DsModel::make_internal_1Dsum_estimator (IdxT *dim,* const ImageSizeT & *size,* const VecT & *min_sigma,* const VecT & *max_sigma,* const CompositeDist & *prior*) [static],[protected],[inherited]

Definition at line 69 of file Gauss2DsModel.cpp.

References mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss2DsModel::min_sigma, and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::Gauss2DsModel(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.15.4.50 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline],[inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.15.4.51 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.15.4.52 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.15.4.53 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.15.4.54 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.15.4.55 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.15.4.56 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta↩_stack().

8.15.4.57 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.15.4.58 CompositeDist mappel::Gauss2DsModel::make_prior_beta_position (const ImageSizeT & *size,* double *beta_xpos,* double *beta_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *max_sigma_ratio,* double *alpha_sigma*) [static],[inherited]

Definition at line 255 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::ImageFormat2DBase::size.

8.15.4.59 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static],[inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.15.4.60 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static],[inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.15.4.61 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static],[inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.15.4.62 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = **default_alpha_sigma**) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.15.4.63 CompositeDist mappel::Gauss2DsModel::make_prior_normal_position (const **ImageSizeT** & *size,* double *sigma_xpos,* double *sigma_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *max_sigma_ratio,* double *alpha_sigma*) [static], [inherited]

Definition at line 271 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::ImageFormat2DBase::size.

8.15.4.64 Gauss2DsModel::Stencil mappel::Gauss2DsModel::make_stencil (const **ParamT** & *theta,* bool *compute_derivatives* = `true`) const [inline], [inherited]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 162 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by mappel::Gauss2DsModel::initial_theta_estimate().

8.15.4.65 Gauss2DsMAP & mappel::Gauss2DsMAP::operator= (const Gauss2DsMAP & *o*)

Definition at line 51 of file Gauss2DsMAP.cpp.

References mappel::MAPEstimator::operator=(), mappel::PoissonNoise2DObjective::operator=(), mappel::Image↩Format2DBase::operator=(), mappel::Gauss2DsModel::operator=(), and mappel::PointEmitterModel::operator=().

8.15.4.66 Gauss2DsMAP & mappel::Gauss2DsMAP::operator= (Gauss2DsMAP && *o*)

Definition at line 62 of file Gauss2DsMAP.cpp.

References mappel::MAPEstimator::operator=(), mappel::PoissonNoise2DObjective::operator=(), mappel::Image↩Format2DBase::operator=(), mappel::Gauss2DsModel::operator=(), and mappel::PointEmitterModel::operator=().

8.15.4.67 void mappel::Gauss2DsModel::pixel_grad (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad*) const [inline], [inherited]

Definition at line 180 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2Ds↩Model::Stencil::DY, mappel::Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::I(), mappel::Gauss2↩DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

Referenced by mappel::Gauss2DsModel::pixel_hess_update().

8.15.4.68 void mappel::Gauss2DsModel::pixel_grad2 (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad2*) const [inline], [inherited]

Definition at line 192 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2DsModel::Stencil::DXS2, mappel::Gauss2↩DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::I(), mappel::↩Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil::sigmaY(), mappel::Gauss2DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.15.4.69 void mappel::Gauss2DsModel::pixel_hess (int *i,* int *j,* const Stencil & *s,* MatT & *hess*) const [inline], [inherited]

Definition at line 204 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2Ds↩Model::Stencil::DXS2, mappel::Gauss2DsModel::Stencil::DXSX, mappel::Gauss2DsModel::Stencil::DY, mappel::↩Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::DYSY, mappel::Gauss2DsModel::Stencil::I(), mappel::Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil↩::sigmaY(), mappel::Gauss2DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.15.4.70 void mappel::Gauss2DsModel::pixel_hess_update (int *i,* int *j,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const [inherited]

pixel derivative inner loop calculations.

Definition at line 358 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2Ds↩ Model::Stencil::DXS2, mappel::Gauss2DsModel::Stencil::DXSX, mappel::Gauss2DsModel::Stencil::DY, mappel::↩ Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::DYSY, mappel::Gauss2DsModel::Stencil::I(), mappel::PointEmitterModel::make_param(), mappel::Gauss2DsModel::pixel_↩ grad(), mappel::Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil::sigmaY(), mappel::Gauss2Ds↩ Model::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.15.4.71 double mappel::Gauss2DsModel::pixel_model_value (int *i,* int *j,* const Stencil & *s*) const [inline], [inherited]

Definition at line 173 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::bg(), mappel::Gauss2DsModel::Stencil::I(), mappel::Gauss2DsModel↩ ::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.15.4.72 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩ EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.15.4.73 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.15.4.74 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.75 void mappel::MCMCAdaptor2Ds::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 56 of file MCMCAdaptor2Ds.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor2Ds::eta_sigma, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptor2D::eta_y, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.15.4.76 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.77 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.15.4.78 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.15.4.79 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_,* const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.15.4.80 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.81 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name,* double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.82 void mappel::Gauss2DsModel::set_hyperparams (const VecT & *hyperparams*) [inherited]

Definition at line 119 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::set_hyperparams(), and mappel::Gauss2DsModel::update_internal_1Dsum↩_estimators().

8.15.4.83 template<class ImT > void mappel::ImageFormat2DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 113 of file ImageFormat2DBase.h.

8.15.4.84 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = -1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.15.4.85 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.15.4.86 void mappel::Gauss2DsModel::set_max_sigma (const VecT & *new_sigma*) [inherited]

Set the max_sigma_ratio based on the new max_sigma's ratio with the current min_sigma.

Definition at line 155 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss2DsModel::compute_max_sigma_ratio(), mappel::Gauss2DsModel::get_min_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.15.4.87 void mappel::Gauss2DsModel::set_max_sigma_ratio (double *max_sigma_ratio*) [inherited]

Definition at line 176 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::Gauss2DsModel::get_max_sigma(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::PointEmitterModel::set_ubound(), mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

Referenced by mappel::Gauss2DsModel::set_max_sigma().

8.15.4.88 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.15.4.89 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma_scale.

8.15.4.90 void mappel::Gauss2DsModel::set_min_sigma (const VecT & *new_sigma*) [inherited]

Set the minimum sigma, keeping the max_sigma_ratio the same.

Definition at line 137 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss2DsModel::get_max_sigma(), mappel::Gauss2DsModel::min_sigma, mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

8.15.4.91 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.15.4.92 void mappel::Gauss2DsModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 107 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::set_prior(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.15.4.93 void mappel::Gauss2DsModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 113 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::set_prior(), and mappel::Gauss2DsModel::update_internal_1Dsum_↩ estimators().

8.15.4.94 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.15.4.95 void mappel::Gauss2DsModel::set_size (const ImageSizeT & *size_*) [inherited]

Definition at line 125 of file Gauss2DsModel.cpp.

References mappel::ImageFormat2DBase::set_size(), mappel::ImageFormat1DBase::set_size(), mappel::Image↩ Format2DBase::size, mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

8.15.4.96 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.15.4.97 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩ EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make↩ _stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::Point↩ EmitterModel::theta_stack_in_bounds().

8.15.4.98 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.15.4.99 void mappel::Gauss2DsModel::update_internal_1Dsum_estimators ( ) [protected], [inherited]

Definition at line 100 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::get_max_sigma(), mappel::PointEmitterModel::get_prior(), mappel::Gauss2Ds↩ Model::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::min_sigma, mappel::ImageFormat2DBase::size, mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::set_hyperparams(), and mappel::Gauss2DsModel::set_prior().

8.15.5 Member Data Documentation

8.15.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2↩ DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.15.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.15.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.15.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.15.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.15.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.15.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.15.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.15.5.9 const std::string mappel::Gauss2DsModel::DefaultPriorType = "Normal" [static], [inherited]

Definition at line 59 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::get_min_sigma().

8.15.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.15.5.11 const std::vector< std::string > mappel::PoissonNoise2DObjective::estimator_names [static], [inherited]

Definition at line 23 of file PoissonNoise2DObjective.h.

8.15.5.12 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D↩ ::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.15.5.13 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D↩ ::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.15.5.14 double mappel::MCMCAdaptor2Ds::eta_sigma =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 26 of file MCMCAdaptor2Ds.h.

Referenced by mappel::MCMCAdaptor2Ds::get_stats(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::↩ MCMCAdaptor2Ds::operator=(), and mappel::MCMCAdaptor2Ds::sample_mcmc_candidate().

8.15.5.15 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1↩ D::sample_mcmc_candidate().

8.15.5.16 double mappel::MCMCAdaptor2D::eta_y =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_y in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor2D.h.

Referenced by mappel::MCMCAdaptor2D::get_stats(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MC↩ MCAdaptor2D::operator=(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor2D↩ ::sample_mcmc_candidate().

8.15.5.17 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.15.5.18 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.15.5.19 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.15.5.20 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_max_size =512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 39 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.15.5.21 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.15.5.22 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_min_size =3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 38 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.15.5.23 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.15.5.24 VecT mappel::Gauss2DsModel::min_sigma [protected],[inherited]

Gaussian PSF in pixels

Definition at line 118 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::compute_max_sigma_ratio(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), Gauss2DsMAP(), mappel::Gauss2DsMLE::Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss2DsModel::get_min_sigma(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss2DsModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::operator=(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil::sigmaY(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.15.5.25 const std::string mappel::Gauss2DsMAP::name [static]

Definition at line 36 of file Gauss2DsMAP.h.

8.15.5.26 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::num_dim =2 [static], [inherited]

Number of image dimensions.

Definition at line 37 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.15.5.27 IdxT mappel::PointEmitterModel::num_hyperparams [protected],[inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.15.5.28 IdxT mappel::PointEmitterModel::num_params [protected],[inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.15.5.29 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.15.5.30 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.15.5.31 const StringVecT mappel::Gauss2DsModel::prior_types [static], [inherited]

Initial value:

```
= { "Beta",
                                                "Normal"
                                                 }
```

Definition at line 58 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::get_min_sigma().

8.15.5.32 double mappel::MCMCAdaptorBase::sigma_scale [protected], [inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.15.5.33 ImageSizeT mappel::ImageFormat2DBase::size [protected],[inherited]

Number of pixels in X dimension for 1D image

Definition at line 67 of file ImageFormat2DBase.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss_heuristic_compute_estimate(), mappel::ImageFormat2DBase::check_image_shape(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss2DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::methods::expected_information(), mappel::Gauss2DModel::Gauss2DModel(), Gauss2DsMAP(), mappel::Gauss2DsMLE::Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::ImageFormat2DBase::get_num_pixels(), mappel::ImageFormat2DBase::get_size(), mappel::ImageFormat2DBase::get_stats(), mappel::methods::likelihood::grad(), mappel::methods::likelihood::grad2(), mappel::methods::likelihood::debug::grad_components(), mappel::methods::likelihood::hessian(), mappel::methods::likelihood::debug::hessian_components(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::ImageFormat2DBase::make_image(), mappel::ImageFormat2DBase::make_image_stack(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss2DsModel::make_prior_normal_position(), mappel::methods::model_image(), mappel::ImageFormat2DBase::operator=(), mappel::methods::likelihood::rllh(), mappel::methods::likelihood::debug::rllh_components(), mappel::ImageFormat2DBase::set_size(), mappel::Gauss2DModel::set_size(), mappel::Gauss2DsModel::set_size(), mappel::methods::simulate_image(), mappel::methods::simulate_image_from_model(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss2DsModel::Stencil::Stencil(), mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.15.5.34 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.15.5.35 Gauss1DSumModelT mappel::Gauss2DsModel::x_model [protected],[inherited]

X-model fits 2D images X-axis (column sum). Using variable sigma 1D model.

Definition at line 119 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_x(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss2DsModel::operator=(), mappel::Gauss2DsModel::set_max_sigma_ratio(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_size(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.15.5.36 Gauss1DSumModelT mappel::Gauss2DsModel::y_model [protected], [inherited]

Y-model fits 2D images Y-axis (row sum). Using variable sigma 1D model.

Definition at line 120 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss2DsModel::operator=(), mappel::Gauss2DsModel::set_max_sigma_ratio(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_size(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

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

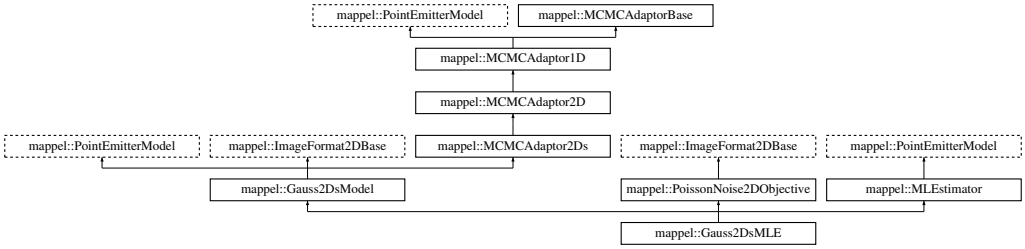
- Gauss2DsMAP.h
- Gauss2DsMAP.cpp

8.16 mappel::Gauss2DsMLE Class Reference

A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum-likelihood objective.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DsMLE.h>`

Inheritance diagram for mappel::Gauss2DsMLE:



Public Types

- using Gauss1DSumModelT = Gauss1DsMAP
- using StencilVecT = std::vector< StencilT >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = arma::Col< CoordT >
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Mat< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Mat< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Cube< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >
- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT

Public Member Functions

- Gauss2DsMLE (const ImageSizeT &size, const VecT &min_sigma, double max_sigma_ratio, const std::string &prior_type=DefaultPriorType)
- Gauss2DsMLE (const ImageSizeT &size, const VecT &min_sigma, const VecT &max_sigma, const std::string &prior_type=DefaultPriorType)
- Gauss2DsMLE (const ImageSizeT &size, const VecT &min_sigma, CompositeDist &&prior)
- Gauss2DsMLE (const ImageSizeT &size, const VecT &min_sigma, const CompositeDist &prior)
- Gauss2DsMLE (const Gauss2DsMLE &o)
- Gauss2DsMLE & operator= (const Gauss2DsMLE &o)
- Gauss2DsMLE (Gauss2DsMLE &&o)
- Gauss2DsMLE & operator= (Gauss2DsMLE &&o)
- void set_hyperparams (const VecT &hyperparams)
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- void set_size (const ImageSizeT &size_)
- VecT get_min_sigma () const
- double get_min_sigma (IdxT dim) const
- VecT get_max_sigma () const
- double get_max_sigma (IdxT dim) const
- double get_max_sigma_ratio () const
- void set_min_sigma (const VecT &min_sigma)
- void set_max_sigma (const VecT &max_sigma)
- void set_max_sigma_ratio (double max_sigma_ratio)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (int i, int j, const Stencil &s) const
- void pixel_grad (int i, int j, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (int i, int j, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (int i, int j, const Stencil &s, MatT &hess) const
- void pixel_hess_update (int i, int j, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im)

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init)
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init, const std::string &estimator)
- Gauss1DSumModelT debug_internal_sum_model_x () const
- Gauss1DSumModelT debug_internal_sum_model_y () const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const

- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- IdxT get_num_hyperparams () const
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- const ImageSizeT & get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (const ImageSizeT &size, double max_sigma_ratio, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (const ImageSizeT &size, double max_sigma_ratio)
- static CompositeDist make_default_prior_normal_position (const ImageSizeT &size, double max_sigma_ratio)
- static CompositeDist make_prior_beta_position (const ImageSizeT &size, double beta_xpos, double beta_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double max_sigma_ratio, double alpha_sigma)
- static CompositeDist make_prior_normal_position (const ImageSizeT &size, double sigma_xpos, double sigma_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double max_sigma_ratio, double alpha_sigma)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string name
- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim =2
- static const ImageCoordT global_min_size =3
- static const ImageCoordT global_max_size =512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5
- static const std::vector< std::string > estimator_names

Protected Member Functions

- void update_internal_1Dsum_estimators ()
- void set_mcmc_num_phases (IdxT num_phases)

Static Protected Member Functions

- static Gauss1DSumModelT make_internal_1Dsum_estimator (IdxT dim, const ImageSizeT &size, const VecT &min_sigma, const VecT &max_sigma, const CompositeDist &prior)
- static double compute_max_sigma_ratio (const VecT &min_sigma, const VecT &max_sigma)

Protected Attributes

- VecT min_sigma
- Gauss1DSumModelT x_model
- Gauss1DSumModelT y_model
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_sigma =0
- double eta_y =0
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.16.1 Detailed Description

A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum-likelihood objective.

Model: Gauss2DsModel - 2D Gaussian variable scalar PSF sigma Objective: PoissonNoise2DObjective - Poisson noise model for 2D Estimator: MLEstimator - Pure-likelihood estimator

Definition at line 24 of file Gauss2DsMLE.h.

8.16.2 Member Typedef Documentation

8.16.2.1 using mappel::Gauss2DsModel::Gauss1DSumModelT = Gauss1DsMAP [inherited]

Definition at line 26 of file Gauss2DsModel.h.

8.16.2.2 using mappel::ImageFormat2DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 24 of file ImageFormat2DBase.h.

8.16.2.3 using mappel::ImageFormat2DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 25 of file ImageFormat2DBase.h.

8.16.2.4 template<class PixelT > using mappel::ImageFormat2DBase::ImageShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 32 of file ImageFormat2DBase.h.

8.16.2.5 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a single image's coordinates

Definition at line 27 of file ImageFormat2DBase.h.

8.16.2.6 using mappel::ImageFormat2DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 29 of file ImageFormat2DBase.h.

8.16.2.7 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeVecShapeT = arma::Mat<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 28 of file ImageFormat2DBase.h.

8.16.2.8 using mappel::ImageFormat2DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 30 of file ImageFormat2DBase.h.

8.16.2.9 template<class PixelT > using mappel::ImageFormat2DBase::ImageStackShapeT = arma::Cube<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 33 of file ImageFormat2DBase.h.

8.16.2.10 using mappel::ImageFormat2DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 35 of file ImageFormat2DBase.h.

8.16.2.11 using mappel::ImageFormat2DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 34 of file ImageFormat2DBase.h.

8.16.2.12 using mappel::PoissonNoise2DObjective::ModelDataStackT = ImageStackT [inherited]

Objective function data stack type: 2D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise2DObjective.h.

8.16.2.13 using mappel::PoissonNoise2DObjective::ModelDataT = ImageT [inherited]

Objective function data type: 2D double precision image, gain-corrected to approximate photons counts

Definition at line 24 of file PoissonNoise2DObjective.h.

8.16.2.14 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.16.2.15 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.16.2.16 using mappel::Gauss2DsModel::StencilVecT = std::vector<Stencil> [inherited]

Definition at line 55 of file Gauss2DsModel.h.

8.16.3 Constructor & Destructor Documentation

8.16.3.1 mappel::Gauss2DsMLE::Gauss2DsMLE (const ImageSizeT & *size,* const VecT & *min_sigma,* double *max_sigma_ratio,* const std::string & *prior_type* = DefaultPriorType)

Definition at line 11 of file Gauss2DsMLE.cpp.

References mappel::Gauss2DsModel::min_sigma, and mappel::ImageFormat2DBase::size.

8.16.3.2 mappel::Gauss2DsMLE::Gauss2DsMLE (const ImageSizeT & *size,* const VecT & *min_sigma,* const VecT & *max_sigma,* const std::string & *prior_type* = DefaultPriorType)

Definition at line 15 of file Gauss2DsMLE.cpp.

References mappel::Gauss2DsModel::compute_max_sigma_ratio(), mappel::Gauss2DsModel::make_default_prior(), mappel::Gauss2DsModel::min_sigma, and mappel::ImageFormat2DBase::size.

8.16.3.3 mappel::Gauss2DsMLE::Gauss2DsMLE (const ImageSizeT & *size,* const VecT & *min_sigma,* CompositeDist && *prior*)

Definition at line 19 of file Gauss2DsMLE.cpp.

8.16.3.4 mappel::Gauss2DsMLE::Gauss2DsMLE (const ImageSizeT & *size,* const VecT & *min_sigma,* const CompositeDist & *prior*)

Definition at line 27 of file Gauss2DsMLE.cpp.

8.16.3.5 mappel::Gauss2DsMLE::Gauss2DsMLE (const Gauss2DsMLE & *o*)

Definition at line 35 of file Gauss2DsMLE.cpp.

8.16.3.6 mappel::Gauss2DsMLE::Gauss2DsMLE (Gauss2DsMLE && *o*)

Definition at line 43 of file Gauss2DsMLE.cpp.

8.16.4 Member Function Documentation

8.16.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.16.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.16.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.16.4.4 void mappel::ImageFormat2DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 80 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.16.4.5 void mappel::ImageFormat2DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 93 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.16.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.16.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.16.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::↩ Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_↩ max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::↩ Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.16.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

8.16.4.10 void mappel::ImageFormat2DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 60 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::global_max_size, and mappel::ImageFormat2DBase::global_min_size.

Referenced by mappel::ImageFormat2DBase::ImageFormat2DBase(), and mappel::ImageFormat2DBase::set_size().

8.16.4.11 double mappel::Gauss2DsModel::compute_max_sigma_ratio (const VecT & *min_sigma,* const VecT & *max_sigma*) [static], [protected], [inherited]

Definition at line 162 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::min_sigma.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DsMAP::Gauss2DsMAP(), Gauss2DsMLE(), and mappel::Gauss2DsModel::set_max_sigma().

8.16.4.12 Gauss1DSumModelT mappel::Gauss2DsModel::debug_internal_sum_model_x ( ) const [inline], [inherited]

Definition at line 104 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::x_model.

8.16.4.13 Gauss1DSumModelT mappel::Gauss2DsModel::debug_internal_sum_model_y ( ) const [inline], [inherited]

Definition at line 105 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::compute_max_sigma_ratio(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss2DsModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::min_sigma, mappel::↩ Gauss2DsModel::operator=(), mappel::PointEmitterModel::prior, mappel::ImageFormat2DBase::size, mappel::↩ Gauss2DsModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::y_model.

8.16.4.14 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.15 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.16 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.16.4.17 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.18 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 106 of file ImageFormat2DBase.h.

8.16.4.19 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.16.4.20 VecT mappel::Gauss2DsModel::get_max_sigma ( ) const [inline], [inherited]

Definition at line 132 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::get_max_sigma_ratio(), and mappel::Gauss2DsModel::get_min_sigma().

Referenced by mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss2DsModel::get_stats(), mappel::Gauss2↩DsModel::operator=(), mappel::Gauss2DsModel::set_max_sigma_ratio(), mappel::Gauss2DsModel::set_min_sigma(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.16.4.21 double mappel::Gauss2DsModel::get_max_sigma (IdxT *dim*) const [inline], [inherited]

Definition at line 136 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::get_max_sigma_ratio(), and mappel::Gauss2DsModel::get_min_sigma().

8.16.4.22 double mappel::Gauss2DsModel::get_max_sigma_ratio ( ) const [inline], [inherited]

Definition at line 140 of file Gauss2DsModel.h.

References mappel::PointEmitterModel::get_ubound().

Referenced by mappel::Gauss2DsModel::get_max_sigma(), and mappel::Gauss2DsModel::get_stats().

8.16.4.23 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.16.4.24 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.16.4.25 VecT mappel::Gauss2DsModel::get_min_sigma ( ) const [inline], [inherited]

Definition at line 128 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::min_sigma.

Referenced by mappel::Gauss2DsModel::get_max_sigma(), mappel::Gauss2DsModel::get_stats(), and mappel::↩Gauss2DsModel::set_max_sigma().

8.16.4.26 double mappel::Gauss2DsModel::get_min_sigma (IdxT *dim*) const [inherited]

Definition at line 191 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::DefaultPriorType, mappel::Gauss2DsModel::min_sigma, and mappel::Gauss2↩DsModel::prior_types.

8.16.4.27 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.16.4.28 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.16.4.29 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 79 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.16.4.30 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.31 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.16.4.32 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.33 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.16.4.34 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.16.4.35 const ImageFormat2DBase::ImageSizeT & mappel::ImageFormat2DBase::get_size ( ) const [inline], [inherited]

Definition at line 74 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.16.4.36 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 41 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.16.4.37 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 99 of file ImageFormat2DBase.h.

8.16.4.38 StatsT mappel::Gauss2DsModel::get_stats ( ) const [inherited]

Definition at line 341 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::get_max_sigma(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_min_sigma(), mappel::MCMCAdaptor2Ds::get_stats(), mappel::ImageFormat2DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.16.4.39 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.16.4.40 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.41 Gauss2DsModel::StencilI mappel::Gauss2DsModel::initial_theta_estimate (const ImageT & *im*) [inline], [inherited]

Fast, heuristic estimate of initial theta.

Definition at line 224 of file Gauss2DsModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::PointEmitterModel::make_↩ param().

Referenced by mappel::Gauss2DsModel::initial_theta_estimate().

8.16.4.42 Gauss2DsModel::StencilI mappel::Gauss2DsModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) [inline], [inherited]

Definition at line 231 of file Gauss2DsModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::Gauss2DsModel::initial_theta_↩ estimate().

8.16.4.43 Gauss2DsModel::StencilI mappel::Gauss2DsModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init,* const std::string & *estimator*) [inherited]

Definition at line 385 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::Stencil::bg(), mappel::methods::estimate_max(), mappel::Gauss2DsModel::↩ Stencil::I(), mappel::PointEmitterModel::lbound, mappel::Gauss2DsModel::make_stencil(), mappel::Gauss2DsModel↩ ::min_sigma, mappel::PointEmitterModel::num_params, mappel::Gauss2DsModel::Stencil::sigma_ratio(), mappel↩ ::ImageFormat2DBase::size, mappel::PointEmitterModel::theta_in_bounds(), mappel::PointEmitterModel::ubound, mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

8.16.4.44 CompositeDist mappel::Gauss2DsModel::make_default_prior (const ImageSizeT & *size,* double *max_sigma_ratio,* const std::string & *prior_type*) [static], [inherited]

Definition at line 208 of file Gauss2DsModel.cpp.

References mappel::istarts_with(), mappel::Gauss2DsModel::make_default_prior_beta_position(), and mappel::↩ Gauss2DsModel::make_default_prior_normal_position().

Referenced by mappel::Gauss2DsMAP::Gauss2DsMAP(), and Gauss2DsMLE().

8.16.4.45 CompositeDist mappel::Gauss2DsModel::make_default_prior_beta_position (const ImageSizeT & *size,* double *max_sigma_ratio*) [static], [inherited]

Definition at line 230 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩ _intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), mappel::PointEmitterModel::make↩ _prior_component_sigma(), and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DsModel::make_default_prior().

8.16.4.46 CompositeDist mappel::Gauss2DsModel::make_default_prior_normal_position (const ImageSizeT & *size,* double *max_sigma_ratio*) [static],[inherited]

Definition at line 243 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DsModel::make_default_prior().

8.16.4.47 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::make_image ( ) const [inline],[inherited]

Definition at line 85 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.16.4.48 ImageFormat2DBase::ImageStackT mappel::ImageFormat2DBase::make_image_stack (ImageCoordT *n*) const [inline],[inherited]

Definition at line 92 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.16.4.49 Gauss2DsModel::Gauss1DSumModelT mappel::Gauss2DsModel::make_internal_1Dsum_estimator (IdxT *dim,* const ImageSizeT & *size,* const VecT & *min_sigma,* const VecT & *max_sigma,* const CompositeDist & *prior*) [static],[protected],[inherited]

Definition at line 69 of file Gauss2DsModel.cpp.

References mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss2DsModel::min_sigma, and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::Gauss2DsModel(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.16.4.50 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline],[inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.16.4.51 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.16.4.52 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.16.4.53 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.16.4.54 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.16.4.55 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.16.4.56 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta↩_stack().

8.16.4.57 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.16.4.58 CompositeDist mappel::Gauss2DsModel::make_prior_beta_position (const ImageSizeT & *size,* double *beta_xpos,* double *beta_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *max_sigma_ratio,* double *alpha_sigma*) [static],[inherited]

Definition at line 255 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::ImageFormat2DBase::size.

8.16.4.59 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static],[inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.16.4.60 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static],[inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.16.4.61 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static],[inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.16.4.62 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = **default_alpha_sigma**) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.16.4.63 CompositeDist mappel::Gauss2DsModel::make_prior_normal_position (const **ImageSizeT** & *size,* double *sigma_xpos,* double *sigma_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *max_sigma_ratio,* double *alpha_sigma*) [static], [inherited]

Definition at line 271 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::ImageFormat2DBase::size.

8.16.4.64 Gauss2DsModel::Stencil mappel::Gauss2DsModel::make_stencil (const **ParamT** & *theta,* bool *compute_derivatives* = `true`) const [inline], [inherited]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 162 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by mappel::Gauss2DsModel::initial_theta_estimate().

8.16.4.65 Gauss2DsMLE & mappel::Gauss2DsMLE::operator= (const Gauss2DsMLE & *o*)

Definition at line 51 of file Gauss2DsMLE.cpp.

References mappel::MLEstimator::operator=(), mappel::PoissonNoise2DObjective::operator=(), mappel::Image↩Format2DBase::operator=(), mappel::Gauss2DsModel::operator=(), and mappel::PointEmitterModel::operator=().

8.16.4.66 Gauss2DsMLE & mappel::Gauss2DsMLE::operator= (Gauss2DsMLE && *o*)

Definition at line 62 of file Gauss2DsMLE.cpp.

References mappel::MLEstimator::operator=(), mappel::PoissonNoise2DObjective::operator=(), mappel::Image↩Format2DBase::operator=(), mappel::Gauss2DsModel::operator=(), and mappel::PointEmitterModel::operator=().

8.16.4.67 void mappel::Gauss2DsModel::pixel_grad (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad*) const [inline], [inherited]

Definition at line 180 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2Ds↩Model::Stencil::DY, mappel::Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::I(), mappel::Gauss2↩DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

Referenced by mappel::Gauss2DsModel::pixel_hess_update().

8.16.4.68 void mappel::Gauss2DsModel::pixel_grad2 (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad2*) const [inline], [inherited]

Definition at line 192 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2DsModel::Stencil::DXS2, mappel::Gauss2↩DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::I(), mappel::↩Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil::sigmaY(), mappel::Gauss2DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.16.4.69 void mappel::Gauss2DsModel::pixel_hess (int *i,* int *j,* const Stencil & *s,* MatT & *hess*) const [inline], [inherited]

Definition at line 204 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2Ds↩Model::Stencil::DXS2, mappel::Gauss2DsModel::Stencil::DXSX, mappel::Gauss2DsModel::Stencil::DY, mappel::↩Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::DYSY, mappel::Gauss2DsModel::Stencil::I(), mappel::Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil↩::sigmaY(), mappel::Gauss2DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.16.4.70 void mappel::Gauss2DsModel::pixel_hess_update (int *i,* int *j,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const [inherited]

pixel derivative inner loop calculations.

Definition at line 358 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2Ds↩ Model::Stencil::DXS2, mappel::Gauss2DsModel::Stencil::DXSX, mappel::Gauss2DsModel::Stencil::DY, mappel::↩ Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::DYSY, mappel::Gauss2DsModel::Stencil::I(), mappel::PointEmitterModel::make_param(), mappel::Gauss2DsModel::pixel_↩ grad(), mappel::Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil::sigmaY(), mappel::Gauss2Ds↩ Model::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.16.4.71 double mappel::Gauss2DsModel::pixel_model_value (int *i,* int *j,* const Stencil & *s*) const [inline], [inherited]

Definition at line 173 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::bg(), mappel::Gauss2DsModel::Stencil::I(), mappel::Gauss2DsModel↩ ::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.16.4.72 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩ EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.16.4.73 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.16.4.74 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.75 void mappel::MCMCAdaptor2Ds::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 56 of file MCMCAdaptor2Ds.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor2Ds::eta_sigma, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptor2D::eta_y, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.16.4.76 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.77 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.16.4.78 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.16.4.79 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_,* const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.16.4.80 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.81 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name,* double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.82 void mappel::Gauss2DsModel::set_hyperparams (const VecT & *hyperparams*) [inherited]

Definition at line 119 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::set_hyperparams(), and mappel::Gauss2DsModel::update_internal_1Dsum↩_estimators().

8.16.4.83 template<class ImT > void mappel::ImageFormat2DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 113 of file ImageFormat2DBase.h.

8.16.4.84 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = -1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.16.4.85 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.16.4.86 void mappel::Gauss2DsModel::set_max_sigma (const VecT & *new_sigma*) [inherited]

Set the max_sigma_ratio based on the new max_sigma's ratio with the current min_sigma.

Definition at line 155 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss2DsModel::compute_max_sigma_ratio(), mappel::Gauss2DsModel::get_min_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.16.4.87 void mappel::Gauss2DsModel::set_max_sigma_ratio (double *max_sigma_ratio*) [inherited]

Definition at line 176 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::Gauss2DsModel::get_max_sigma(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::PointEmitterModel::set_ubound(), mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

Referenced by mappel::Gauss2DsModel::set_max_sigma().

8.16.4.88 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.16.4.89 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma_scale.

8.16.4.90 void mappel::Gauss2DsModel::set_min_sigma (const VecT & *new_sigma*) [inherited]

Set the minimum sigma, keeping the max_sigma_ratio the same.

Definition at line 137 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), mappel::Gauss2DsModel::get_max_sigma(), mappel::Gauss2DsModel::min_sigma, mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

8.16.4.91 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.16.4.92 void mappel::Gauss2DsModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 107 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::set_prior(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.16.4.93 void mappel::Gauss2DsModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 113 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::set_prior(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.16.4.94 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.16.4.95 void mappel::Gauss2DsModel::set_size (const ImageSizeT & *size_*) [inherited]

Definition at line 125 of file Gauss2DsModel.cpp.

References mappel::ImageFormat2DBase::set_size(), mappel::ImageFormat1DBase::set_size(), mappel::ImageFormat2DBase::size, mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

8.16.4.96 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.16.4.97 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.16.4.98 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.16.4.99 void mappel::Gauss2DsModel::update_internal_1Dsum_estimators ( ) [protected], [inherited]

Definition at line 100 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::get_max_sigma(), mappel::PointEmitterModel::get_prior(), mappel::Gauss2Ds↩ Model::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::min_sigma, mappel::ImageFormat2DBase::size, mappel::Gauss2DsModel::x_model, and mappel::Gauss2DsModel::y_model.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::set_hyperparams(), and mappel::Gauss2DsModel::set_prior().

8.16.5 Member Data Documentation

8.16.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2↩ DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.16.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.16.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.16.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.16.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.16.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.16.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.16.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.16.5.9 const std::string mappel::Gauss2DsModel::DefaultPriorType = "Normal" [static], [inherited]

Definition at line 59 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::get_min_sigma().

8.16.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.16.5.11 const std::vector< std::string > mappel::PoissonNoise2DObjective::estimator_names [static], [inherited]

Definition at line 23 of file PoissonNoise2DObjective.h.

8.16.5.12 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D↩ ::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.16.5.13 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D↩ ::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.16.5.14 double mappel::MCMCAdaptor2Ds::eta_sigma =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 26 of file MCMCAdaptor2Ds.h.

Referenced by mappel::MCMCAdaptor2Ds::get_stats(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::↩ MCMCAdaptor2Ds::operator=(), and mappel::MCMCAdaptor2Ds::sample_mcmc_candidate().

8.16.5.15 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D↩ ::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1↩ D::sample_mcmc_candidate().

8.16.5.16 double mappel::MCMCAdaptor2D::eta_y =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_y in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor2D.h.

Referenced by mappel::MCMCAdaptor2D::get_stats(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MC↩ MCAdaptor2D::operator=(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor2D↩ ::sample_mcmc_candidate().

8.16.5.17 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.16.5.18 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.16.5.19 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.16.5.20 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_max_size =512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 39 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.16.5.21 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.16.5.22 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_min_size =3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 38 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.16.5.23 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.16.5.24 VecT mappel::Gauss2DsModel::min_sigma [protected],[inherited]

Gaussian PSF in pixels

Definition at line 118 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::compute_max_sigma_ratio(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DsMAP::Gauss2DsMAP(), Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss2DsModel::get_min_sigma(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss2DsModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::operator=(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil::sigmaY(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.16.5.25 const std::string mappel::Gauss2DsMLE::name [static]

Definition at line 36 of file Gauss2DsMLE.h.

8.16.5.26 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::num_dim =2 [static], [inherited]

Number of image dimensions.

Definition at line 37 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.16.5.27 IdxT mappel::PointEmitterModel::num_hyperparams [protected],[inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.16.5.28 IdxT mappel::PointEmitterModel::num_params [protected],[inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.16.5.29 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.16.5.30 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.16.5.31 const StringVecT mappel::Gauss2DsModel::prior_types [static], [inherited]

Initial value:

```
= { "Beta",
                                                "Normal"
                                                 }
```

Definition at line 58 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::get_min_sigma().

8.16.5.32 double mappel::MCMCAdaptorBase::sigma_scale [protected], [inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.16.5.33 ImageSizeT mappel::ImageFormat2DBase::size [protected],[inherited]

Number of pixels in X dimension for 1D image

Definition at line 67 of file ImageFormat2DBase.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss_heuristic_compute_estimate(), mappel::ImageFormat2DBase::check_image_shape(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss2DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::methods::expected_information(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsMAP::Gauss2DsMAP(), Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::ImageFormat2DBase::get_num_pixels(), mappel::ImageFormat2DBase::get_size(), mappel::ImageFormat2DBase::get_stats(), mappel::methods::likelihood::grad(), mappel::methods::likelihood::grad2(), mappel::methods::likelihood::debug::grad_components(), mappel::methods::likelihood::hessian(), mappel::methods::likelihood::debug::hessian_components(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::ImageFormat2DBase::make_image(), mappel::ImageFormat2DBase::make_image_stack(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss2DsModel::make_prior_normal_position(), mappel::methods::model_image(), mappel::ImageFormat2DBase::operator=(), mappel::methods::likelihood::rllh(), mappel::methods::likelihood::debug::rllh_components(), mappel::ImageFormat2DBase::set_size(), mappel::Gauss2DModel::set_size(), mappel::Gauss2DsModel::set_size(), mappel::methods::simulate_image(), mappel::methods::simulate_image_from_model(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss2DsModel::Stencil::Stencil(), mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.16.5.34 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.16.5.35 Gauss1DSumModelT mappel::Gauss2DsModel::x_model [protected],[inherited]

X-model fits 2D images X-axis (column sum). Using variable sigma 1D model.

Definition at line 119 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_x(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss2DsModel::operator=(), mappel::Gauss2DsModel::set_max_sigma_ratio(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_size(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.16.5.36 Gauss1DSumModelT mappel::Gauss2DsModel::y_model [protected], [inherited]

Y-model fits 2D images Y-axis (row sum). Using variable sigma 1D model.

Definition at line 120 of file Gauss2DsModel.h.

Referenced by mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::Gauss2Ds↩ Model(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss2DsModel::operator=(), mappel::Gauss2↩ DsModel::set_max_sigma_ratio(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_size(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

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

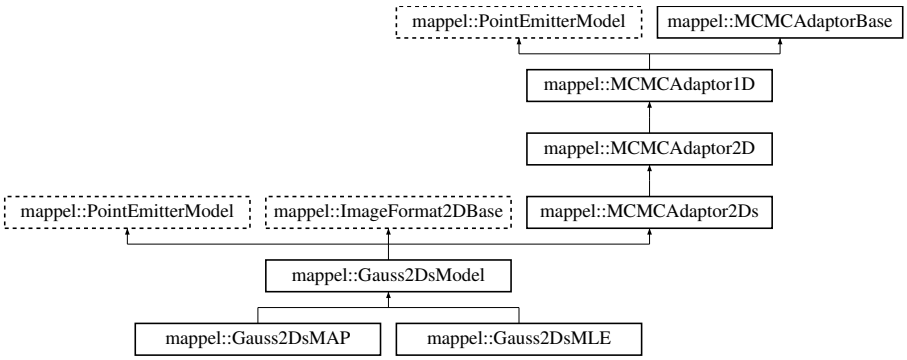
- Gauss2DsMLE.h
- Gauss2DsMLE.cpp

8.17 mappel::Gauss2DsModel Class Reference

A base class for 2D Gaussian PSF where the gaussian sigma is controlled by a single scalar parameter which is called sigma_ratio. The size of the gaussian psf is sigma_ratio∗psf_sigma, where psf_sigma is considered as a vector [psf_↩ sigmaX, psf_sigmaY].

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DsModel.h>`

Inheritance diagram for mappel::Gauss2DsModel:



Classes

- class Stencil

  Stencil for 2D scalar-sigma models.

Public Types

- using Gauss1DSumModelT = Gauss1DsMAP
- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = arma::Col< CoordT >
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Mat< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Mat< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Cube< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >

Public Member Functions

- void set_hyperparams (const VecT &hyperparams)
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- void set_size (const ImageSizeT &size_)
- VecT get_min_sigma () const
- double get_min_sigma (IdxT dim) const
- VecT get_max_sigma () const
- double get_max_sigma (IdxT dim) const
- double get_max_sigma_ratio () const
- void set_min_sigma (const VecT &min_sigma)
- void set_max_sigma (const VecT &max_sigma)
- void set_max_sigma_ratio (double max_sigma_ratio)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (int i, int j, const Stencil &s) const
- void pixel_grad (int i, int j, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (int i, int j, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (int i, int j, const Stencil &s, MatT &hess) const
- void pixel_hess_update (int i, int j, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im)

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init)
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init, const std::string &estimator)
- Gauss1DSumModelT debug_internal_sum_model_x () const

- Gauss1DSumModelT debug_internal_sum_model_y () const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- IdxT get_num_hyperparams () const
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const

- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- const ImageSizeT & get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (const ImageSizeT &size, double max_sigma_ratio, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (const ImageSizeT &size, double max_sigma_ratio)
- static CompositeDist make_default_prior_normal_position (const ImageSizeT &size, double max_sigma_ratio)
- static CompositeDist make_prior_beta_position (const ImageSizeT &size, double beta_xpos, double beta_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double max_sigma_ratio, double alpha_sigma)
- static CompositeDist make_prior_normal_position (const ImageSizeT &size, double sigma_xpos, double sigma_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double max_sigma_ratio, double alpha_sigma)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1

- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim =2
- static const ImageCoordT global_min_size =3
- static const ImageCoordT global_max_size =512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5

Protected Member Functions

- Gauss2DsModel (const ImageSizeT &size, const VecT &min_sigma, const VecT &max_sigma)
- Gauss2DsModel (const Gauss2DsModel &o)
- Gauss2DsModel (Gauss2DsModel &&o)
- Gauss2DsModel & operator= (const Gauss2DsModel &o)
- Gauss2DsModel & operator= (Gauss2DsModel &&o)
- void update_internal_1Dsum_estimators ()
- void set_mcmc_num_phases (IdxT num_phases)

Static Protected Member Functions

- static Gauss1DSumModelT make_internal_1Dsum_estimator (IdxT dim, const ImageSizeT &size, const VecT &min_sigma, const VecT &max_sigma, const CompositeDist &prior)
- static double compute_max_sigma_ratio (const VecT &min_sigma, const VecT &max_sigma)

Protected Attributes

- VecT min_sigma
- Gauss1DSumModelT x_model
- Gauss1DSumModelT y_model
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_sigma =0
- double eta_y =0
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.17.1 Detailed Description

A base class for 2D Gaussian PSF where the gaussian sigma is controlled by a single scalar parameter which is called sigma_ratio. The size of the gaussian psf is sigma_ratio∗psf_sigma, where psf_sigma is considered as a vector [psf_↩ sigmaX, psf_sigmaY].

Definition at line 23 of file Gauss2DsModel.h.

8.17.2 Member Typedef Documentation

8.17.2.1 using mappel::Gauss2DsModel::Gauss1DSumModelT = Gauss1DsMAP

Definition at line 26 of file Gauss2DsModel.h.

8.17.2.2 using mappel::ImageFormat2DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 24 of file ImageFormat2DBase.h.

8.17.2.3 using mappel::ImageFormat2DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 25 of file ImageFormat2DBase.h.

8.17.2.4 template<class PixelT > using mappel::ImageFormat2DBase::ImageShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 32 of file ImageFormat2DBase.h.

8.17.2.5 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a single image's coordinates

Definition at line 27 of file ImageFormat2DBase.h.

8.17.2.6 using mappel::ImageFormat2DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 29 of file ImageFormat2DBase.h.

8.17.2.7 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeVecShapeT = arma::Mat<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 28 of file ImageFormat2DBase.h.

8.17.2.8 using mappel::ImageFormat2DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 30 of file ImageFormat2DBase.h.

8.17.2.9 template<class PixelT > using mappel::ImageFormat2DBase::ImageStackShapeT = arma::Cube<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 33 of file ImageFormat2DBase.h.

8.17.2.10 using mappel::ImageFormat2DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 35 of file ImageFormat2DBase.h.

8.17.2.11 using mappel::ImageFormat2DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 34 of file ImageFormat2DBase.h.

8.17.2.12 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.17.2.13 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.17.2.14 using mappel::Gauss2DsModel::StencilVecT = std::vector<Stencil>

Definition at line 55 of file Gauss2DsModel.h.

8.17.3 Constructor & Destructor Documentation

8.17.3.1 mappel::Gauss2DsModel::Gauss2DsModel (const ImageSizeT & *size,* const VecT & *min_sigma,* const VecT & *max_sigma*) [protected]

Definition at line 12 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), make_internal_1Dsum_estimator(), min_sigma, mappel::PointEmitterModel::prior, mappel::ImageFormat2DBase::size, and y_model.

Referenced by debug_internal_sum_model_y().

8.17.3.2 mappel::Gauss2DsModel::Gauss2DsModel (const Gauss2DsModel & *o*) [protected]

Definition at line 28 of file Gauss2DsModel.cpp.

References get_max_sigma(), make_internal_1Dsum_estimator(), min_sigma, mappel::PointEmitterModel::prior, mappel::ImageFormat2DBase::size, and y_model.

8.17.3.3 mappel::Gauss2DsModel::Gauss2DsModel (Gauss2DsModel && *o*) [protected]

Definition at line 36 of file Gauss2DsModel.cpp.

References get_max_sigma(), make_internal_1Dsum_estimator(), min_sigma, mappel::PointEmitterModel::prior, mappel::ImageFormat2DBase::size, and y_model.

8.17.4 Member Function Documentation

8.17.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.17.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.17.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.17.4.4 void mappel::ImageFormat2DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 80 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.17.4.5 void mappel::ImageFormat2DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 93 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.17.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.17.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.17.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.17.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

8.17.4.10 void mappel::ImageFormat2DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 60 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::global_max_size, and mappel::ImageFormat2DBase::global_min_size.

Referenced by mappel::ImageFormat2DBase::ImageFormat2DBase(), and mappel::ImageFormat2DBase::set_size().

8.17.4.11 double mappel::Gauss2DsModel::compute_max_sigma_ratio (const VecT & *min_sigma,* const VecT & *max_sigma*) [static], [protected]

Definition at line 162 of file Gauss2DsModel.cpp.

References min_sigma.

Referenced by debug_internal_sum_model_y(), mappel::Gauss2DsMAP::Gauss2DsMAP(), mappel::Gauss2DsMLE↩ ::Gauss2DsMLE(), and set_max_sigma().

8.17.4.12 Gauss1DSumModelT mappel::Gauss2DsModel::debug_internal_sum_model_x ( ) const [inline]

Definition at line 104 of file Gauss2DsModel.h.

References x_model.

8.17.4.13 Gauss1DSumModelT mappel::Gauss2DsModel::debug_internal_sum_model_y ( ) const [inline]

Definition at line 105 of file Gauss2DsModel.h.

References compute_max_sigma_ratio(), Gauss2DsModel(), make_internal_1Dsum_estimator(), min_sigma, operator=(), mappel::PointEmitterModel::prior, mappel::ImageFormat2DBase::size, update_internal_1Dsum_estimators(), and y_model.

8.17.4.14 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.15 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.16 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.17.4.17 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.18 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 106 of file ImageFormat2DBase.h.

8.17.4.19 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.17.4.20 VecT mappel::Gauss2DsModel::get_max_sigma ( ) const [inline]

Definition at line 132 of file Gauss2DsModel.h.

References get_max_sigma_ratio(), and get_min_sigma().

Referenced by Gauss2DsModel(), get_stats(), operator=(), set_max_sigma_ratio(), set_min_sigma(), and update_↩ internal_1Dsum_estimators().

8.17.4.21 double mappel::Gauss2DsModel::get_max_sigma (IdxT *dim*) const [inline]

Definition at line 136 of file Gauss2DsModel.h.

References get_max_sigma_ratio(), and get_min_sigma().

8.17.4.22 double mappel::Gauss2DsModel::get_max_sigma_ratio ( ) const [inline]

Definition at line 140 of file Gauss2DsModel.h.

References mappel::PointEmitterModel::get_ubound().

Referenced by get_max_sigma(), and get_stats().

8.17.4.23 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.17.4.24 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.17.4.25 VecT mappel::Gauss2DsModel::get_min_sigma ( ) const [inline]

Definition at line 128 of file Gauss2DsModel.h.

References min_sigma.

Referenced by get_max_sigma(), get_stats(), and set_max_sigma().

8.17.4.26 double mappel::Gauss2DsModel::get_min_sigma (IdxT *dim*) const

Definition at line 191 of file Gauss2DsModel.cpp.

References DefaultPriorType, min_sigma, and prior_types.

8.17.4.27 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.17.4.28 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.17.4.29 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 79 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.17.4.30 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.31 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and update_internal_1Dsum_↩ estimators().

8.17.4.32 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.33 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.17.4.34 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.17.4.35 const ImageFormat2DBase::ImageSizeT & mappel::ImageFormat2DBase::get_size ( ) const [inline], [inherited]

Definition at line 74 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.17.4.36 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 41 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.17.4.37 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 99 of file ImageFormat2DBase.h.

8.17.4.38 StatsT mappel::Gauss2DsModel::get_stats ( ) const

Definition at line 341 of file Gauss2DsModel.cpp.

References get_max_sigma(), get_max_sigma_ratio(), get_min_sigma(), mappel::MCMCAdaptor2Ds::get_stats(), mappel::ImageFormat2DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.17.4.39 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), get_max_sigma_ratio(), mappel::MCMC↩ Adaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_↩ background_mcmc_sampling(), and set_max_sigma_ratio().

8.17.4.40 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.41 Gauss2DsModel::StencilI mappel::Gauss2DsModel::initial_theta_estimate (const ImageT & *im*) [inline]

Fast, heuristic estimate of initial theta.

Definition at line 224 of file Gauss2DsModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::PointEmitterModel::make_↩ param().

Referenced by initial_theta_estimate().

8.17.4.42 Gauss2DsModel::Stencil mappel::Gauss2DsModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) [inline]

Definition at line 231 of file Gauss2DsModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and initial_theta_estimate().

8.17.4.43 Gauss2DsModel::Stencil mappel::Gauss2DsModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init,* const std::string & *estimator*)

Definition at line 385 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::Stencil::bg(), mappel::methods::estimate_max(), mappel::Gauss2DsModel::Stencil::I(), mappel::PointEmitterModel::lbound, make_stencil(), min_sigma, mappel::PointEmitterModel::num_params, mappel::Gauss2DsModel::Stencil::sigma_ratio(), mappel::ImageFormat2DBase::size, mappel::PointEmitterModel::theta_in_bounds(), mappel::PointEmitterModel::ubound, x_model, and y_model.

8.17.4.44 CompositeDist mappel::Gauss2DsModel::make_default_prior (const ImageSizeT & *size,* double *max_sigma_ratio,* const std::string & *prior_type*) [static]

Definition at line 208 of file Gauss2DsModel.cpp.

References mappel::istarts_with(), make_default_prior_beta_position(), and make_default_prior_normal_position().

Referenced by mappel::Gauss2DsMAP::Gauss2DsMAP(), and mappel::Gauss2DsMLE::Gauss2DsMLE().

8.17.4.45 CompositeDist mappel::Gauss2DsModel::make_default_prior_beta_position (const ImageSizeT & *size,* double *max_sigma_ratio*) [static]

Definition at line 230 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_beta(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::ImageFormat2DBase::size.

Referenced by make_default_prior().

8.17.4.46 CompositeDist mappel::Gauss2DsModel::make_default_prior_normal_position (const ImageSizeT & *size,* double *max_sigma_ratio*) [static]

Definition at line 243 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::ImageFormat2DBase::size.

Referenced by make_default_prior().

8.17.4.47 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::make_image ( ) const [inline], [inherited]

Definition at line 85 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.17.4.48 ImageFormat2DBase::ImageStackT mappel::ImageFormat2DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 92 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.17.4.49 Gauss2DsModel::Gauss1DSumModelT mappel::Gauss2DsModel::make_internal_1Dsum_estimator (IdxT *dim,* const ImageSizeT & *size,* const VecT & *min_sigma,* const VecT & *max_sigma,* const CompositeDist & *prior*) [static], [protected]

Definition at line 69 of file Gauss2DsModel.cpp.

References mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_↩ position(), min_sigma, and mappel::ImageFormat2DBase::size.

Referenced by debug_internal_sum_model_y(), Gauss2DsModel(), and update_internal_1Dsum_estimators().

8.17.4.50 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), initial_theta_↩ estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::↩ Gauss2DModel::pixel_hess_update(), and pixel_hess_update().

8.17.4.51 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.17.4.52 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.17.4.53 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.17.4.54 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.17.4.55 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.17.4.56 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta↩_stack().

8.17.4.57 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.17.4.58 CompositeDist mappel::Gauss2DsModel::make_prior_beta_position (const ImageSizeT & *size,* double *beta_xpos,* double *beta_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *max_sigma_ratio,* double *alpha_sigma*) [static]

Definition at line 255 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior↩_component_position_beta(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::Image↩Format2DBase::size.

8.17.4.59 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = **default_mean_I**, double *kappa* = **default_intensity_kappa**) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and make_prior_normal_position().

8.17.4.60 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size*, double *pos_beta* = **default_beta_pos**) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and make_prior_beta_position().

8.17.4.61 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size*, double *pos_sigma* = **default_sigma_pos**) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and make_prior_normal_position().

8.17.4.62 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma*, double *max_sigma*, double *alpha* = **default_alpha_sigma**) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and make_prior_normal_position().

8.17.4.63 CompositeDist mappel::Gauss2DsModel::make_prior_normal_position (const ImageSizeT & *size*, double *sigma_xpos*, double *sigma_ypos*, double *mean_I*, double *kappa_I*, double *mean_bg*, double *kappa_bg*, double *max_sigma_ratio*, double *alpha_sigma*) [static]

Definition at line 271 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), mappel::PointEmitterModel::make_prior_component_position_normal(), mappel::PointEmitterModel::make_prior_component_sigma(), and mappel::ImageFormat2DBase::size.

8.17.4.64 Gauss2DsModel::Stencil mappel::Gauss2DsModel::make_stencil (const ParamT & *theta,* bool *compute_derivatives* = true) const [inline]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 162 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by initial_theta_estimate().

8.17.4.65 Gauss2DsModel & mappel::Gauss2DsModel::operator= (const Gauss2DsModel & *o*) [protected]

Definition at line 44 of file Gauss2DsModel.cpp.

References get_max_sigma(), min_sigma, mappel::MCMCAdaptor2Ds::operator=(), x_model, and y_model.

Referenced by debug_internal_sum_model_y(), mappel::Gauss2DsMAP::operator=(), and mappel::Gauss2DsMLE::operator=().

8.17.4.66 Gauss2DsModel & mappel::Gauss2DsModel::operator= (Gauss2DsModel && *o*) [protected]

Definition at line 56 of file Gauss2DsModel.cpp.

References min_sigma, mappel::MCMCAdaptor2Ds::operator=(), x_model, and y_model.

8.17.4.67 void mappel::Gauss2DsModel::pixel_grad (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad*) const [inline]

Definition at line 180 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2DsModel::Stencil::DY, mappel::Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::I(), mappel::Gauss2DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

Referenced by pixel_hess_update().

8.17.4.68 void mappel::Gauss2DsModel::pixel_grad2 (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad2*) const [inline]

Definition at line 192 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2DsModel::Stencil::DXS2, mappel::Gauss2↩ DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::I(), mappel::↩ Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil::sigmaY(), mappel::Gauss2DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.17.4.69 void mappel::Gauss2DsModel::pixel_hess (int *i,* int *j,* const Stencil & *s,* MatT & *hess*) const [inline]

Definition at line 204 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2Ds↩ Model::Stencil::DXS2, mappel::Gauss2DsModel::Stencil::DXSX, mappel::Gauss2DsModel::Stencil::DY, mappel::↩ Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::DYSY, mappel::Gauss2DsModel::Stencil::I(), mappel::Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil↩ ::sigmaY(), mappel::Gauss2DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.17.4.70 void mappel::Gauss2DsModel::pixel_hess_update (int *i,* int *j,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const

pixel derivative inner loop calculations.

Definition at line 358 of file Gauss2DsModel.cpp.

References mappel::Gauss2DsModel::Stencil::DX, mappel::Gauss2DsModel::Stencil::DXS, mappel::Gauss2Ds↩ Model::Stencil::DXS2, mappel::Gauss2DsModel::Stencil::DXSX, mappel::Gauss2DsModel::Stencil::DY, mappel::↩ Gauss2DsModel::Stencil::DYS, mappel::Gauss2DsModel::Stencil::DYS2, mappel::Gauss2DsModel::Stencil::DYSY, mappel::Gauss2DsModel::Stencil::I(), mappel::PointEmitterModel::make_param(), pixel_grad(), mappel::Gauss2↩ DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil::sigmaY(), mappel::Gauss2DsModel::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.17.4.71 double mappel::Gauss2DsModel::pixel_model_value (int *i,* int *j,* const Stencil & *s*) const [inline]

Definition at line 173 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::Stencil::bg(), mappel::Gauss2DsModel::Stencil::I(), mappel::Gauss2DsModel↩ ::Stencil::X, and mappel::Gauss2DsModel::Stencil::Y.

8.17.4.72 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩ EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.17.4.73 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.17.4.74 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.75 void mappel::MCMCAdaptor2Ds::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 56 of file MCMCAdaptor2Ds.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor2Ds::eta_sigma, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptor2D::eta_y, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.17.4.76 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.77 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.17.4.78 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.17.4.79 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.17.4.80 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.81 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.82 void mappel::Gauss2DsModel::set_hyperparams (const VecT & *hyperparams*)

Definition at line 119 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::set_hyperparams(), and update_internal_1Dsum_estimators().

8.17.4.83 template<class ImT > void mappel::ImageFormat2DBase::set_image_in_stack (ImageStackT & *stack*, ImageCoordT *n*, const ImT & *im*) const [inherited]

Definition at line 113 of file ImageFormat2DBase.h.

8.17.4.84 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = -1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitterModel::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.17.4.85 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.17.4.86 void mappel::Gauss2DsModel::set_max_sigma (const VecT & *new_sigma*)

Set the max_sigma_ratio based on the new max_sigma's ratio with the current min_sigma.

Definition at line 155 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), compute_max_sigma_ratio(), get_min_sigma(), and set_max_sigma_ratio().

8.17.4.87 void mappel::Gauss2DsModel::set_max_sigma_ratio (double *max_sigma_ratio*)

Definition at line 176 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, get_max_sigma(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::PointEmitterModel::set_ubound(), x_model, and y_model.

Referenced by set_max_sigma().

8.17.4.88 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.17.4.89 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma_scale.

8.17.4.90 void mappel::Gauss2DsModel::set_min_sigma (const VecT & *new_sigma*)

Set the minimum sigma, keeping the max_sigma_ratio the same.

Definition at line 137 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), get_max_sigma(), min_sigma, mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), x_model, and y_model.

8.17.4.91 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.17.4.92 void mappel::Gauss2DsModel::set_prior (CompositeDist && *prior_*)

Definition at line 107 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::set_prior(), and update_internal_1Dsum_estimators().

8.17.4.93 void mappel::Gauss2DsModel::set_prior (const CompositeDist & *prior_*)

Definition at line 113 of file Gauss2DsModel.cpp.

References mappel::PointEmitterModel::set_prior(), and update_internal_1Dsum_estimators().

8.17.4.94 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.17.4.95 void mappel::Gauss2DsModel::set_size (const ImageSizeT & *size_*)

Definition at line 125 of file Gauss2DsModel.cpp.

References mappel::ImageFormat2DBase::set_size(), mappel::ImageFormat1DBase::set_size(), mappel::Image↩Format2DBase::size, x_model, and y_model.

8.17.4.96 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and set_max_sigma_ratio().

8.17.4.97 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), initial_theta_estimate(), mappel::Gauss1DModel↩::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::↩Gauss2DsxyModel::make_stencil(), make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.17.4.98 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.17.4.99 void mappel::Gauss2DsModel::update_internal_1Dsum_estimators ( ) [protected]

Definition at line 100 of file Gauss2DsModel.cpp.

References get_max_sigma(), mappel::PointEmitterModel::get_prior(), make_internal_1Dsum_estimator(), min_sigma, mappel::ImageFormat2DBase::size, x_model, and y_model.

Referenced by debug_internal_sum_model_y(), set_hyperparams(), and set_prior().

8.17.5 Member Data Documentation

8.17.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), set_max_sigma↩_ratio(), and mappel::PointEmitterModel::set_ubound().

8.17.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.17.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.17.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.17.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.17.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.17.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.17.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.17.5.9 const std::string mappel::Gauss2DsModel::DefaultPriorType = "Normal" [static]

Definition at line 59 of file Gauss2DsModel.h.

Referenced by get_min_sigma().

8.17.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and initial_theta_estimate().

8.17.5.11 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.17.5.12 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.17.5.13 double mappel::MCMCAdaptor2Ds::eta_sigma =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 26 of file MCMCAdaptor2Ds.h.

Referenced by mappel::MCMCAdaptor2Ds::get_stats(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor2Ds::operator=(), and mappel::MCMCAdaptor2Ds::sample_mcmc_candidate().

8.17.5.14 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.17.5.15 double mappel::MCMCAdaptor2D::eta_y =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_y in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor2D.h.

Referenced by mappel::MCMCAdaptor2D::get_stats(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2D::operator=(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor2D::sample_mcmc_candidate().

8.17.5.16 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.17.5.17 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.17.5.18 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.17.5.19 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_max_size =512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 39 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.17.5.20 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.17.5.21 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_min_size =3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 38 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.17.5.22 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel↩ ::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta↩ _estimate(), mappel::Gauss2DModel::initial_theta_estimate(), initial_theta_estimate(), mappel::PointEmitterModel↩ ::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::Point↩ EmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.17.5.23 VecT mappel::Gauss2DsModel::min_sigma [protected]

Gaussian PSF in pixels

Definition at line 118 of file Gauss2DsModel.h.

Referenced by compute_max_sigma_ratio(), debug_internal_sum_model_y(), mappel::Gauss2DsMAP::Gauss2DsMAP(), mappel::Gauss2DsMLE::Gauss2DsMLE(), Gauss2DsModel(), get_min_sigma(), initial_theta_estimate(), make_internal_1Dsum_estimator(), operator=(), set_min_sigma(), mappel::Gauss2DsModel::Stencil::sigmaX(), mappel::Gauss2DsModel::Stencil::sigmaY(), and update_internal_1Dsum_estimators().

8.17.5.24 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::num_dim =2 [static], [inherited]

Number of image dimensions.

Definition at line 37 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.17.5.25 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.17.5.26 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.17.5.27 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.17.5.28 CompositeDist mappel::PointEmitterModel::prior [protected],[inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.17.5.29 const StringVecT mappel::Gauss2DsModel::prior_types [static]

Initial value:

```
= { "Beta",
                                                "Normal"
                                                 }
```

Definition at line 58 of file Gauss2DsModel.h.

Referenced by get_min_sigma().

8.17.5.30 double mappel::MCMCAdaptorBase::sigma_scale [protected],[inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.17.5.31 ImageSizeT mappel::ImageFormat2DBase::size [protected],[inherited]

Number of pixels in X dimension for 1D image

Definition at line 67 of file ImageFormat2DBase.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss_heuristic_compute_estimate(), mappel::ImageFormat2DBase::check_image_shape(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss2DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::debug_internal_sum_model_y(), debug_internal_sum_model_y(), mappel::methods::expected_information(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsMAP::Gauss2DsMAP(), mappel::Gauss2DsMLE::Gauss2DsMLE(), Gauss2DsModel(), mappel::ImageFormat2DBase::get_num_pixels(), mappel::ImageFormat2DBase::get_size(), mappel::ImageFormat2DBase::get_stats(), mappel::methods::likelihood::grad(), mappel::methods::likelihood::grad2(), mappel::methods::likelihood::debug::grad_components(), mappel::methods::likelihood::hessian(), mappel::methods::likelihood::debug::hessian_components(), mappel::Gauss2DModel::initial_theta_estimate(), initial_theta_estimate(), mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), mappel::Gauss2DModel::make_default_prior_beta_position(), make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), make_default_prior_normal_position(), mappel::ImageFormat2DBase::make_image(), mappel::ImageFormat2DBase::make_image_stack(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), make_internal_1Dsum_estimator(), mappel::Gauss2DModel::make_prior_beta_position(), make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), make_prior_normal_position(), mappel::methods::model_image(), mappel::ImageFormat2DBase::operator=(), mappel::methods::likelihood::rllh(), mappel::methods::likelihood::debug::rllh_components(), mappel::ImageFormat2DBase::set_size(), mappel::Gauss2DModel::set_size(), set_size(), mappel::methods::simulate_image(), mappel::methods::simulate_image_from_model(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss2DsModel::Stencil::Stencil(), mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and update_internal_1Dsum_estimators().

8.17.5.32 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.17.5.33 Gauss1DSumModelT mappel::Gauss2DsModel::x_model [protected]

X-model fits 2D images X-axis (column sum). Using variable sigma 1D model.

Definition at line 119 of file Gauss2DsModel.h.

Referenced by debug_internal_sum_model_x(), initial_theta_estimate(), operator=(), set_max_sigma_ratio(), set_min_sigma(), set_size(), and update_internal_1Dsum_estimators().

8.17.5.34 Gauss1DSumModelT mappel::Gauss2DsModel::y_model [protected]

Y-model fits 2D images Y-axis (row sum). Using variable sigma 1D model.

Definition at line 120 of file Gauss2DsModel.h.

Referenced by debug_internal_sum_model_y(), Gauss2DsModel(), initial_theta_estimate(), operator=(), set_max_↩ sigma_ratio(), set_min_sigma(), set_size(), and update_internal_1Dsum_estimators().

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

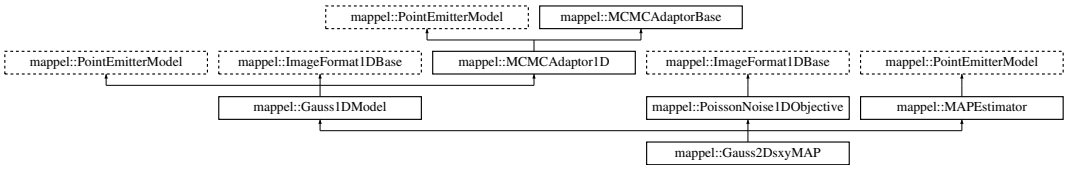
- Gauss2DsModel.h
- Gauss2DsModel.cpp

8.18 mappel::Gauss2DsxyMAP Class Reference

A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DsxyMAP.h>`

Inheritance diagram for mappel::Gauss2DsxyMAP:



Public Types

- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = CoordT
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Col< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Col< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Mat< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >
- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT

Public Member Functions

- Gauss2DsxyMAP (const ImageSizeT &size, const VecT &min_sigma, const VecT &max_sigma)
- Gauss2DsxyMAP (const ImageSizeT &size, const VecT &min_sigma, const VecT &max_sigma, CompositeDist &&prior)
- double get_psf_sigma () const
- double get_psf_sigma (IdxT idx) const
- void set_psf_sigma (double new_psf_sigma)
- void set_psf_sigma (const VecT &new_psf_sigma)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (IdxT i, const Stencil &s) const
- void pixel_grad (IdxT i, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (IdxT i, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (IdxT i, const Stencil &s, MatT &hess) const
- void pixel_hess_update (IdxT i, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const

  pixel derivative inner loop calculations.
- Stencil initial_theta_estimate (const ImageT &im) const

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init) const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)

- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- ImageSizeT get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void set_size (const arma::Col< ImageCoordT > &sz)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.
- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static CompositeDist make_default_prior (IdxT size, const std::string &prior_type)
- static CompositeDist make_default_prior_beta_position (IdxT size)
- static CompositeDist make_default_prior_normal_position (IdxT size)
- static CompositeDist make_prior_beta_position (IdxT size, double beta_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)
- static CompositeDist make_prior_normal_position (IdxT size, double sigma_xpos, double mean_I, double kappa_I, double mean_bg, double kappa_bg)

- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string name
- static const StringVecT prior_types
- static const std::string DefaultPriorType = "Normal"
- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim = 1
- static const ImageCoordT global_min_size = 3
- static const ImageCoordT global_max_size = 512
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5
- static const std::vector< std::string > estimator_names

Protected Member Functions

- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- double psf_sigma
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size
- double eta_x =0
- double eta_l =0
- double eta_bg =0
- IdxT num_phases
- double sigma_scale

8.18.1 Detailed Description

A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.

Model: Gauss1DModel a 1D gaussian PSF with fixed psf_sigma Objective Statistical Noise Model: PoissonNoise1D↩ MAPObjective an MLE objective for Poisson noise ImageFormat: ImageFormat1DBase - Data format

Definition at line 25 of file Gauss2DsxyMAP.h.

8.18.2 Member Typedef Documentation

8.18.2.1 using mappel::ImageFormat1DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 25 of file ImageFormat1DBase.h.

8.18.2.2 using mappel::ImageFormat1DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 26 of file ImageFormat1DBase.h.

8.18.2.3 template<class PixelT > using mappel::ImageFormat1DBase::ImageShapeT = arma::Col<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 33 of file ImageFormat1DBase.h.

8.18.2.4 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeShapeT = CoordT [inherited]

Shape of the data type to store 1-image's coordinates

Definition at line 28 of file ImageFormat1DBase.h.

8.18.2.5 using mappel::ImageFormat1DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 30 of file ImageFormat1DBase.h.

8.18.2.6 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeVecShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 29 of file ImageFormat1DBase.h.

8.18.2.7 using mappel::ImageFormat1DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 31 of file ImageFormat1DBase.h.

8.18.2.8 template<class PixelT > using mappel::ImageFormat1DBase::ImageStackShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 34 of file ImageFormat1DBase.h.

8.18.2.9 using mappel::ImageFormat1DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 36 of file ImageFormat1DBase.h.

8.18.2.10 using mappel::ImageFormat1DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 35 of file ImageFormat1DBase.h.

8.18.2.11 using mappel::PoissonNoise1DObjective::ModelDataStackT = ImageStackT [inherited]

Objective function data stack type: 1D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 26 of file PoissonNoise1DObjective.h.

8.18.2.12 using mappel::PoissonNoise1DObjective::ModelDataT = ImageT [inherited]

Objective function data type: 1D double precision image, gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise1DObjective.h.

8.18.2.13 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.18.2.14 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.18.2.15 using mappel::Gauss1DModel::StencilVecT = std::vector<Stencil> [inherited]

Definition at line 49 of file Gauss1DModel.h.

8.18.3 Constructor & Destructor Documentation

8.18.3.1 mappel::Gauss2DsxyMAP::Gauss2DsxyMAP (const ImageSizeT & *size,* const VecT & *min_sigma,* const VecT & *max_sigma*)

8.18.3.2 mappel::Gauss2DsxyMAP::Gauss2DsxyMAP (const ImageSizeT & *size,* const VecT & *min_sigma,* const VecT & *max_sigma,* CompositeDist && *prior*)

8.18.4 Member Function Documentation

8.18.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.18.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.18.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.18.4.4 void ImageFormat1DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 59 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.18.4.5 void ImageFormat1DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 71 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.18.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.18.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.18.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::↩ Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_↩ max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::↩ Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.18.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

8.18.4.10 void ImageFormat1DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 39 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::global_max_size, and mappel::ImageFormat1DBase::global_min_size.

Referenced by mappel::ImageFormat1DBase::ImageFormat1DBase(), and mappel::ImageFormat1DBase::set_size().

8.18.4.11 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.12 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.13 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.18.4.14 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.15 ImageFormat1DBase::ImageT ImageFormat1DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 108 of file ImageFormat1DBase.h.

8.18.4.16 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.18.4.17 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.18.4.18 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.18.4.19 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.18.4.20 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.18.4.21 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 82 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.18.4.22 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.23 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.18.4.24 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.25 double mappel::Gauss1DModel::get_psf_sigma ( ) const [inline], [inherited]

Definition at line 127 of file Gauss1DModel.h.

References mappel::Gauss1DModel::psf_sigma.

Referenced by mappel::Gauss1DModel::get_stats().

8.18.4.26 double mappel::Gauss1DModel::get_psf_sigma (IdxT *idx*) const [inherited]

Definition at line 131 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::psf_sigma.

8.18.4.27 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.18.4.28 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.18.4.29 ImageFormat1DBase::ImageSizeT ImageFormat1DBase::get_size ( ) const [inline], [inherited]

Definition at line 71 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.18.4.30 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 20 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.18.4.31 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 101 of file ImageFormat1DBase.h.

8.18.4.32 StatsT mappel::Gauss1DModel::get_stats ( ) const [inherited]

Definition at line 178 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::get_psf_sigma(), mappel::MCMCAdaptor1D::get_stats(), mappel::ImageFormat1DBase::get_stats(), and mappel::PointEmitterModel::get_stats().

8.18.4.33 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.18.4.34 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.35 Gauss1DModel::StencilI mappel::Gauss1DModel::initial_theta_estimate (const ImageT & *im*) const [inline], [inherited]

Fast, heuristic estimate of initial theta.

Definition at line 169 of file Gauss1DModel.h.

References mappel::PointEmitterModel::make_param(), and mappel::Gauss1DModel::Stencil::theta.

8.18.4.36 Gauss1DModel::StencilI mappel::Gauss1DModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) const [inherited]

Definition at line 207 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::Stencil::bg(), mappel::Gauss1DModel::Stencil::I(), mappel::Gauss1DModel↩ ::make_stencil(), mappel::PointEmitterModel::num_params, and mappel::ImageFormat1DBase::size.

8.18.4.37 CompositeDist mappel::Gauss1DModel::make_default_prior (IdxT *size,* const std::string & *prior_type*) [static], [inherited]

Definition at line 59 of file Gauss1DModel.cpp.

References mappel::istarts_with(), mappel::Gauss1DModel::make_default_prior_beta_position(), and mappel::↩ Gauss1DModel::make_default_prior_normal_position().

8.18.4.38 CompositeDist mappel::Gauss1DModel::make_default_prior_beta_position (IdxT *size*) [static], [inherited]

Definition at line 80 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩ _intensity(), and mappel::PointEmitterModel::make_prior_component_position_beta().

Referenced by mappel::Gauss1DModel::make_default_prior().

8.18.4.39 CompositeDist mappel::Gauss1DModel::make_default_prior_normal_position (IdxT *size*) [static], [inherited]

Definition at line 90 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::PointEmitterModel::make_prior_component↩ _intensity(), and mappel::PointEmitterModel::make_prior_component_position_normal().

Referenced by mappel::Gauss1DModel::make_default_prior().

8.18.4.40 ImageFormat1DBase::ImageT ImageFormat1DBase::make_image ( ) const [inline], [inherited]

Definition at line 87 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.18.4.41 ImageFormat1DBase::ImageStackT ImageFormat1DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 94 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.18.4.42 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.18.4.43 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.18.4.44 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.18.4.45 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.18.4.46 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.18.4.47 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.18.4.48 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.18.4.49 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.18.4.50 CompositeDist mappel::Gauss1DModel::make_prior_beta_position (IdxT *size,* double *beta_xpos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static], [inherited]

Definition at line 101 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_prior_component_position_beta().

Referenced by mappel::Gauss2DModel::make_internal_1Dsum_estimator().

8.18.4.51 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.18.4.52 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.18.4.53 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.18.4.54 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.18.4.55 CompositeDist mappel::Gauss1DModel::make_prior_normal_position (IdxT *size,* double *sigma_xpos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg*) [static], [inherited]

Definition at line 114 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::make_prior_component_intensity(), and mappel::PointEmitterModel::make_prior_component_position_normal().

Referenced by mappel::Gauss2DModel::make_internal_1Dsum_estimator().

8.18.4.56 Gauss1DModel::Stencil mappel::Gauss1DModel::make_stencil (const ParamT & *theta,* bool *compute_derivatives* = true) const [inline], [inherited]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 116 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

Referenced by mappel::Gauss1DModel::initial_theta_estimate().

8.18.4.57 void mappel::Gauss1DModel::pixel_grad (IdxT *i,* const Stencil & *s,* ParamT & *pgrad*) const [inline], [inherited]

Definition at line 141 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DX, mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel::Stencil::X.

Referenced by mappel::Gauss1DModel::pixel_hess_update().

8.18.4.58 void mappel::Gauss1DModel::pixel_grad2 (IdxT *i,* const Stencil & *s,* ParamT & *pgrad2*) const [inline], [inherited]

Definition at line 150 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel::psf_sigma.

8.18.4.59 void mappel::Gauss1DModel::pixel_hess (IdxT *i,* const Stencil & *s,* MatT & *hess*) const [inline], [inherited]

Definition at line 159 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::DX, mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel::psf_sigma.

8.18.4.60 void mappel::Gauss1DModel::pixel_hess_update (IdxT *i,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const [inherited]

pixel derivative inner loop calculations.

Definition at line 191 of file Gauss1DModel.cpp.

References mappel::Gauss1DModel::Stencil::DXS, mappel::Gauss1DModel::Stencil::I(), mappel::PointEmitterModel::make_param(), mappel::Gauss1DModel::pixel_grad(), and mappel::Gauss1DModel::psf_sigma.

8.18.4.61 double mappel::Gauss1DModel::pixel_model_value (IdxT *i,* const Stencil & *s*) const [inline], [inherited]

Definition at line 135 of file Gauss1DModel.h.

References mappel::Gauss1DModel::Stencil::bg(), mappel::Gauss1DModel::Stencil::I(), and mappel::Gauss1DModel::Stencil::X.

8.18.4.62 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.18.4.63 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.18.4.64 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.65 void mappel::MCMCAdaptor1D::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0) [inherited]

Definition at line 108 of file MCMCAdaptor1D.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_l, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.18.4.66 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.67 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.18.4.68 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.18.4.69 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.18.4.70 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.71 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.72 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.18.4.73 template<class ImT > void ImageFormat1DBase::set_image_in_stack (ImageStackT & *stack*, ImageCoordT *n*, const ImT & *im*) const [inherited]

Definition at line 115 of file ImageFormat1DBase.h.

8.18.4.74 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = −1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩ Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.18.4.75 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.18.4.76 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩ Ds().

8.18.4.77 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩ _scale.

8.18.4.78 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.18.4.79 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.18.4.80 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.18.4.81 void mappel::Gauss1DModel::set_psf_sigma (double *new_psf_sigma*) [inherited]

Definition at line 125 of file Gauss1DModel.cpp.

References mappel::PointEmitterModel::check_psf_sigma(), and mappel::Gauss1DModel::psf_sigma.

Referenced by mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.18.4.82 void mappel::Gauss1DModel::set_psf_sigma (const **VecT** & *new_psf_sigma*) [inline], [inherited]

Definition at line 131 of file Gauss1DModel.h.

References mappel::Gauss1DModel::set_psf_sigma().

8.18.4.83 void mappel::PointEmitterModel::set_rng_seed (**RngSeedT** *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.18.4.84 void ImageFormat1DBase::set_size (const **ImageSizeT** & *size_*) [inherited]

Definition at line 30 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::check_size(), and mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::set_size(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DsModel::set_size().

8.18.4.85 void ImageFormat1DBase::set_size (const arma::Col< **ImageCoordT** > & *sz*) [inline], [inherited]

Definition at line 75 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::set_size().

8.18.4.86 void mappel::PointEmitterModel::set_ubound (const **ParamT** & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.18.4.87 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.18.4.88 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.18.5 Member Data Documentation

8.18.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.18.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.18.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.18.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.18.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.18.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.18.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.18.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.18.5.9 const std::string mappel::Gauss1DModel::DefaultPriorType = "Normal" [static], [inherited]

Definition at line 53 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::operator=().

8.18.5.10 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.18.5.11 const std::vector< std::string > mappel::PoissonNoise1DObjective::estimator_names [static], [inherited]

Definition at line 24 of file PoissonNoise1DObjective.h.

8.18.5.12 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.18.5.13 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.18.5.14 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.18.5.15 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.18.5.16 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.18.5.17 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.18.5.18 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_max_size = 512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 40 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.18.5.19 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.18.5.20 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_min_size = 3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 39 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.18.5.21 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.18.5.22 const std::string mappel::Gauss2DsxyMAP::name [static]

Definition at line 30 of file Gauss2DsxyMAP.h.

8.18.5.23 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::num_dim = 1 [static],[inherited]

Number of image dimensions.

Definition at line 38 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.18.5.24 IdxT mappel::PointEmitterModel::num_hyperparams [protected],[inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.18.5.25 IdxT mappel::PointEmitterModel::num_params [protected],[inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.18.5.26 IdxT mappel::MCMCAdaptorBase::num_phases [protected],[inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.18.5.27 CompositeDist mappel::PointEmitterModel::prior [protected],[inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.18.5.28 const StringVecT mappel::Gauss1DModel::prior_types [static], [inherited]

Initial value:

```
= { "Beta",
                                                    "Normal"
                                                  }
```

Definition at line 52 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::operator=().

8.18.5.29 double mappel::Gauss1DModel::psf_sigma [protected], [inherited]

Standard deviation of the fixed-sigma 1D Gaussian PSF in pixels

Definition at line 90 of file Gauss1DModel.h.

Referenced by mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::Gauss1DModel::get_psf_sigma(), mappel::Gauss1DModel::operator=(), mappel::Gauss1DModel::pixel_grad2(), mappel::Gauss1DModel::pixel_hess(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss1D↩ Model::Stencil::Stencil().

8.18.5.30 double mappel::MCMCAdaptorBase::sigma_scale [protected], [inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMC↩ Adaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set↩ _background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMC↩ AdaptorBase::set_mcmc_sigma_scale().

8.18.5.31 ImageSizeT mappel::ImageFormat1DBase::size [protected], [inherited]

Number of pixels in X dimension for 1D image

Definition at line 65 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_image_shape(), mappel::Gauss1DsModel::Stencil::compute↩ _derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::ImageFormat1DBase::get_num↩ _pixels(), mappel::ImageFormat1DBase::get_size(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::↩ Gauss1DsModel::initial_theta_estimate(), mappel::ImageFormat1DBase::make_image(), mappel::ImageFormat1↩ DBase::make_image_stack(), mappel::ImageFormat1DBase::set_size(), mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::Gauss1DModel::Stencil::Stencil().

8.18.5.32 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

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

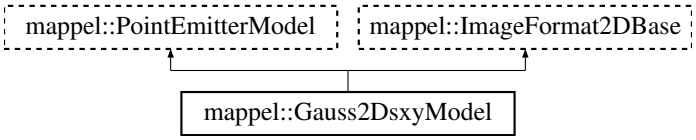
- Gauss2DsxyMAP.h

8.19 mappel::Gauss2DsxyModel Class Reference

A base class for 2D Gaussian PSF with axis-aligned gaussian with free parameters for both sigma_x and sigma_y. Gaussian sigma parameters sigma_x and sigma_y are measured in units of pixels. The model has 6 parameters, [x,y,I,bg,sigma_x,sigma_y].

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DsxyModel.h>`

Inheritance diagram for mappel::Gauss2DsxyModel:



Classes

- class Stencil

  Stencil for 2D free-sigma (astigmatic) models.

Public Types

- using StencilVecT = std::vector< Stencil >
- using ParamT = arma::vec
- using ParamVecT = arma::mat
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = arma::Col< CoordT >
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Mat< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Mat< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Cube< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >

Public Member Functions

- Gauss2DsxyModel (const ImageSizeT &size, const VecT &min_sigma, const VecT &max_sigma)
- void set_hyperparams (const VecT &hyperparams)
- void set_prior (CompositeDist &&prior_)
- void set_size (const ImageSizeT &size_)
- VecT get_min_sigma () const
- double get_min_sigma (IdxT dim) const
- VecT get_max_sigma () const
- double get_max_sigma (IdxT dim) const
- double get_max_sigma_ratio () const
- void set_min_sigma (const VecT &min_sigma)
- void set_max_sigma (const VecT &max_sigma)
- void set_max_sigma_ratio (double max_sigma_ratio)
- StatsT get_stats () const
- Stencil make_stencil (const ParamT &theta, bool compute_derivatives=true) const

  Make a new Model::Stencil object at theta.
- double pixel_model_value (int i, int j, const Stencil &s) const
- void pixel_grad (int i, int j, const Stencil &s, ParamT &pgrad) const
- void pixel_grad2 (int i, int j, const Stencil &s, ParamT &pgrad2) const
- void pixel_hess (int i, int j, const Stencil &s, MatT &hess) const
- void pixel_hess_update (int i, int j, const Stencil &s, double dm_ratio_m1, double dmm_ratio, ParamT &grad, MatT &hess) const
- Stencil initial_theta_estimate (const ImageT &im)

  Fast, heuristic estimate of initial theta.
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init)
- Stencil initial_theta_estimate (const ImageT &im, const ParamT &theta_init, const std::string &estimator)
- void sample_mcmc_candidate (int sample_index, ParamT &canidate_theta, double scale=1.0)
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const

- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- const ImageSizeT & get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.

Static Public Member Functions

- static CompositeDist make_default_prior (const ImageSizeT &size, double max_sigma_ratio)
- static CompositeDist make_prior_beta_position (const ImageSizeT &size, double beta_xpos, double beta_ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double max_sigma_ratio, double alpha_↩ sigma)
- static CompositeDist make_prior_normal_position (const ImageSizeT &size, double sigma_xpos, double sigma↩ _ypos, double mean_I, double kappa_I, double mean_bg, double kappa_bg, double max_sigma_ratio, double alpha_sigma)
- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)

- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()
- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const ImageCoordT num_dim =2
- static const ImageCoordT global_min_size =3
- static const ImageCoordT global_max_size =512

Protected Member Functions

- void update_internal_1D_estimators ()

Static Protected Member Functions

- static double compute_max_sigma_ratio (const VecT &min_sigma, const VecT &max_sigma)

Protected Attributes

- double mcmc_candidate_eta_y
- double mcmc_candidate_eta_sigma
- VecT min_sigma
- Gauss1DsMAP x_model
- Gauss1DsMAP y_model
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- ImageSizeT size

8.19.1 Detailed Description

A base class for 2D Gaussian PSF with axis-aligned gaussian with free parameters for both sigma_x and sigma_y. Gaussian sigma parameters sigma_x and sigma_y are measured in units of pixels. The model has 6 parameters, [x,y,I,bg,sigma_x,sigma_y].

Importantly sigma_x and sigma_y must be in the range given by parameters min_sigma, max_sigma. Each is a 2-element vector, giving the minimum and maximum acceptable values for the gaussian sigma. It is important that min_sigma is at least 0.5 pixel, estimating gaussian centers when any component of the sigma is significantly smaller than a pixel will lead to poor results anyways.

Definition at line 27 of file Gauss2DsxyModel.h.

8.19.2 Member Typedef Documentation

8.19.2.1 using mappel::ImageFormat2DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 24 of file ImageFormat2DBase.h.

8.19.2.2 using mappel::ImageFormat2DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 25 of file ImageFormat2DBase.h.

8.19.2.3 template<class PixelT > using mappel::ImageFormat2DBase::ImageShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 32 of file ImageFormat2DBase.h.

8.19.2.4 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a single image's coordinates

Definition at line 27 of file ImageFormat2DBase.h.

8.19.2.5 using mappel::ImageFormat2DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 29 of file ImageFormat2DBase.h.

8.19.2.6 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeVecShapeT = arma::Mat<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 28 of file ImageFormat2DBase.h.

8.19.2.7 using mappel::ImageFormat2DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 30 of file ImageFormat2DBase.h.

8.19.2.8 template<class PixelT > using mappel::ImageFormat2DBase::ImageStackShapeT = arma::Cube<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 33 of file ImageFormat2DBase.h.

8.19.2.9 using mappel::ImageFormat2DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 35 of file ImageFormat2DBase.h.

8.19.2.10 using mappel::ImageFormat2DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 34 of file ImageFormat2DBase.h.

8.19.2.11 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.19.2.12 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.19.2.13 using mappel::Gauss2DsxyModel::StencilVecT = std::vector<Stencil>

Definition at line 59 of file Gauss2DsxyModel.h.

8.19.3 Constructor & Destructor Documentation

8.19.3.1 mappel::Gauss2DsxyModel::Gauss2DsxyModel (const ImageSizeT & *size,* const VecT & *min_sigma,* const VecT & *max_sigma*)

8.19.4 Member Function Documentation

8.19.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.19.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.19.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.19.4.4 void mappel::ImageFormat2DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 80 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.19.4.5 void mappel::ImageFormat2DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 93 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.19.4.6 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.19.4.7 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.19.4.8 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.19.4.9 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.19.4.10 void mappel::ImageFormat2DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 60 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::global_max_size, and mappel::ImageFormat2DBase::global_min_size.

Referenced by mappel::ImageFormat2DBase::ImageFormat2DBase(), and mappel::ImageFormat2DBase::set_size().

8.19.4.11 static double mappel::Gauss2DsxyModel::compute_max_sigma_ratio (const VecT & *min_sigma,* const VecT & *max_sigma*) [static],[protected]

8.19.4.12 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.13 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline],[inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.14 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.19.4.15 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.16 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline],[inherited]

Definition at line 106 of file ImageFormat2DBase.h.

8.19.4.17 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.19.4.18 VecT mappel::Gauss2DsxyModel::get_max_sigma ( ) const [inline]

Definition at line 127 of file Gauss2DsxyModel.h.

References get_max_sigma_ratio(), and get_min_sigma().

8.19.4.19 double mappel::Gauss2DsxyModel::get_max_sigma (IdxT *dim*) const [inline]

Definition at line 131 of file Gauss2DsxyModel.h.

References get_max_sigma_ratio(), and get_min_sigma().

8.19.4.20 double mappel::Gauss2DsxyModel::get_max_sigma_ratio ( ) const [inline]

Definition at line 135 of file Gauss2DsxyModel.h.

References mappel::PointEmitterModel::get_ubound().

Referenced by get_max_sigma().

8.19.4.21 VecT mappel::Gauss2DsxyModel::get_min_sigma ( ) const [inline]

Definition at line 122 of file Gauss2DsxyModel.h.

References min_sigma.

Referenced by get_max_sigma().

8.19.4.22 double mappel::Gauss2DsxyModel::get_min_sigma (IdxT *dim*) const

8.19.4.23 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.19.4.24 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.19.4.25 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 79 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.19.4.26 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.27 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.19.4.28 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.29 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.19.4.30 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.19.4.31 const ImageFormat2DBase::ImageSizeT & mappel::ImageFormat2DBase::get_size ( ) const [inline], [inherited]

Definition at line 74 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.19.4.32 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 41 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.19.4.33 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 99 of file ImageFormat2DBase.h.

8.19.4.34 StatsT mappel::Gauss2DsxyModel::get_stats ( ) const

8.19.4.35 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1↩D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background↩_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.19.4.36 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.37 Gauss2DsxyModel::StencilmappelGauss2DsxyModelinitial_theta_estimate (const ImageT & *im*) [inline]

Fast, heuristic estimate of initial theta.

Definition at line 222 of file Gauss2DsxyModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and mappel::PointEmitterModel::make_↩param().

Referenced by initial_theta_estimate().

8.19.4.38 Gauss2DsxyModel::StencilmappelGauss2DsxyModelinitial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init*) [inline]

Definition at line 229 of file Gauss2DsxyModel.h.

References mappel::PointEmitterModel::DefaultSeperableInitEstimator, and initial_theta_estimate().

8.19.4.39 Stencil mappel::Gauss2DsxyModel::initial_theta_estimate (const ImageT & *im,* const ParamT & *theta_init,* const std::string & *estimator*)

8.19.4.40 static CompositeDist mappel::Gauss2DsxyModel::make_default_prior (const ImageSizeT & *size,* double *max_sigma_ratio*) [static]

8.19.4.41 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::make_image ( ) const [inline], [inherited]

Definition at line 85 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.19.4.42 ImageFormat2DBase::ImageStackT mappel::ImageFormat2DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 92 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.19.4.43 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.19.4.44 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.19.4.45 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.19.4.46 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.19.4.47 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.19.4.48 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.19.4.49 **PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const** [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.19.4.50 **template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*, FillT *fill*) const** [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.19.4.51 **static CompositeDist mappel::Gauss2DsxyModel::make_prior_beta_position (const ImageSizeT & *size*, double *beta_xpos*, double *beta_ypos*, double *mean_I*, double *kappa_I*, double *mean_bg*, double *kappa_bg*, double *max_sigma_ratio*, double *alpha_sigma*)** [static]

8.19.4.52 **prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa)** [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.19.4.53 **prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size*, double *pos_beta* = default_beta_pos)** [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.19.4.54 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.19.4.55 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.19.4.56 static CompositeDist mappel::Gauss2DsxyModel::make_prior_normal_position (const ImageSizeT & *size,* double *sigma_xpos,* double *sigma_ypos,* double *mean_I,* double *kappa_I,* double *mean_bg,* double *kappa_bg,* double *max_sigma_ratio,* double *alpha_sigma*) [static]

8.19.4.57 Gauss2DsxyModel::Stencil mappel::Gauss2DsxyModel::make_stencil (const ParamT & *theta,* bool *compute_derivatives* = true) const [inline]

Make a new Model::Stencil object at theta.

Stencils store all of the important calculations necessary for evaluating the log-likelihood and its derivatives at a particular theta (parameter) value.

This allows re-use of the most expensive computations. Stencils can be easily passed around by reference, and most functions in the mappel::methods namespace accept a const Stencil reference in place of the model parameter.

Throws mappel::ModelBoundsError if not model.theta_in_bounds(theta).

If derivatives will not be computed with this stencil set compute_derivatives=false

Parameters

theta	Prameter to evaluate at
compute_derivatives	True to also prepare for derivative computations

Returns

A new Stencil object ready to compute with

Definition at line 157 of file Gauss2DsxyModel.h.

References mappel::Gauss2DsxyModel::Stencil::Stencil(), and mappel::PointEmitterModel::theta_in_bounds().

8.19.4.58 void mappel::Gauss2DsxyModel::pixel_grad (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad*) const [inline]

Definition at line 178 of file Gauss2DsxyModel.h.

References mappel::Gauss2DsxyModel::Stencil::DX, mappel::Gauss2DsxyModel::Stencil::DXS, mappel::Gauss2↩ DsxyModel::Stencil::DY, mappel::Gauss2DsxyModel::Stencil::DYS, mappel::Gauss2DsxyModel::Stencil::I(), mappel::↩ Gauss2DsxyModel::Stencil::X, and mappel::Gauss2DsxyModel::Stencil::Y.

8.19.4.59 void mappel::Gauss2DsxyModel::pixel_grad2 (int *i,* int *j,* const Stencil & *s,* ParamT & *pgrad2*) const [inline]

Definition at line 190 of file Gauss2DsxyModel.h.

References mappel::Gauss2DsxyModel::Stencil::DXS, mappel::Gauss2DsxyModel::Stencil::DXS2, mappel::↩ Gauss2DsxyModel::Stencil::DYS, mappel::Gauss2DsxyModel::Stencil::DYS2, mappel::Gauss2DsxyModel::Stencil::I(), mappel::Gauss2DsxyModel::Stencil::sigmaX(), mappel::Gauss2DsxyModel::Stencil::sigmaY(), mappel::Gauss2Dsxy↩ Model::Stencil::X, and mappel::Gauss2DsxyModel::Stencil::Y.

8.19.4.60 void mappel::Gauss2DsxyModel::pixel_hess (int *i,* int *j,* const Stencil & *s,* MatT & *hess*) const [inline]

Definition at line 202 of file Gauss2DsxyModel.h.

References mappel::Gauss2DsxyModel::Stencil::DX, mappel::Gauss2DsxyModel::Stencil::DXS, mappel::Gauss2↩ DsxyModel::Stencil::DXS2, mappel::Gauss2DsxyModel::Stencil::DXSX, mappel::Gauss2DsxyModel::Stencil::DY, mappel::Gauss2DsxyModel::Stencil::DYS, mappel::Gauss2DsxyModel::Stencil::DYS2, mappel::Gauss2DsxyModel↩ ::Stencil::DYSY, mappel::Gauss2DsxyModel::Stencil::I(), mappel::Gauss2DsxyModel::Stencil::sigmaX(), mappel::↩ Gauss2DsxyModel::Stencil::sigmaY(), mappel::Gauss2DsxyModel::Stencil::X, and mappel::Gauss2DsxyModel::↩ Stencil::Y.

8.19.4.61 void mappel::Gauss2DsxyModel::pixel_hess_update (int *i,* int *j,* const Stencil & *s,* double *dm_ratio_m1,* double *dmm_ratio,* ParamT & *grad,* MatT & *hess*) const

8.19.4.62 double mappel::Gauss2DsxyModel::pixel_model_value (int *i,* int *j,* const Stencil & *s*) const [inline]

Definition at line 171 of file Gauss2DsxyModel.h.

References mappel::Gauss2DsxyModel::Stencil::bg(), mappel::Gauss2DsxyModel::Stencil::I(), mappel::Gauss2Dsxy↩ Model::Stencil::X, and mappel::Gauss2DsxyModel::Stencil::Y.

8.19.4.63 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩ EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.19.4.64 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.19.4.65 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.66 void mappel::Gauss2DsxyModel::sample_mcmc_candidate (int *sample_index,* ParamT & *canidate_theta,* double *scale* = 1.0)

8.19.4.67 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.68 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.19.4.69 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_,* const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.19.4.70 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.71 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name,* double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.72 void mappel::Gauss2DsxyModel::set_hyperparams (const VecT & *hyperparams*)

8.19.4.73 template<class ImT > void mappel::ImageFormat2DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 113 of file ImageFormat2DBase.h.

8.19.4.74 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.19.4.75 void mappel::Gauss2DsxyModel::set_max_sigma (const VecT & *max_sigma*)

8.19.4.76 void mappel::Gauss2DsxyModel::set_max_sigma_ratio (double *max_sigma_ratio*)

8.19.4.77 void mappel::Gauss2DsxyModel::set_min_sigma (const VecT & *min_sigma*)

8.19.4.78 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.19.4.79 void mappel::Gauss2DsxyModel::set_prior (CompositeDist && *prior_*)

8.19.4.80 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.19.4.81 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.19.4.82 void mappel::Gauss2DsxyModel::set_size (const ImageSizeT & *size_*)

8.19.4.83 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.19.4.84 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.19.4.85 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.19.4.86 void mappel::Gauss2DsxyModel::update_internal_1D_estimators ( ) [protected]

8.19.5 Member Data Documentation

8.19.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.19.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.19.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.19.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.19.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.19.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.19.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make↩
_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2↩
DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_↩
normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D↩
::set_background_mcmc_sampling().

8.19.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.19.5.9 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), initial_theta_estimate(), and mappel::Gauss2Ds↩ Model::initial_theta_estimate().

8.19.5.10 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.19.5.11 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_max_size =512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 39 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.19.5.12 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.19.5.13 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_min_size =3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 38 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.19.5.14 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.19.5.15 double mappel::Gauss2DsxyModel::mcmc_candidate_eta_sigma [protected]

The standard deviation for the normally distributed pertebation to theta_sigma in the random walk MCMC sampling

Definition at line 108 of file Gauss2DsxyModel.h.

8.19.5.16 double mappel::Gauss2DsxyModel::mcmc_candidate_eta_y [protected]

Std-dev for the normal perturbations to theta_y under MCMC sampling

Definition at line 107 of file Gauss2DsxyModel.h.

8.19.5.17 VecT mappel::Gauss2DsxyModel::min_sigma [protected]

Gaussian PSF in pixels

Definition at line 113 of file Gauss2DsxyModel.h.

Referenced by get_min_sigma().

8.19.5.18 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::num_dim =2 [static], [inherited]

Number of image dimensions.

Definition at line 37 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.19.5.19 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.19.5.20 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.19.5.21 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.19.5.22 ImageSizeT mappel::ImageFormat2DBase::size [protected], [inherited]

Number of pixels in X dimension for 1D image

Definition at line 67 of file ImageFormat2DBase.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss_heuristic_compute_estimate(), mappel::ImageFormat2DBase::check_image_shape(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss2DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::methods::expected_information(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsMAP::Gauss2DsMAP(), mappel::Gauss2DsMLE::Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::ImageFormat2DBase::get_num_pixels(), mappel::ImageFormat2DBase::get_size(), mappel::ImageFormat2DBase::get_stats(), mappel::methods::likelihood::grad(), mappel::methods::likelihood::grad2(), mappel::methods::likelihood::debug::grad_components(), mappel::methods::likelihood::hessian(), mappel::methods::likelihood::debug::hessian_components(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::ImageFormat2DBase::make_image(), mappel::ImageFormat2DBase::make_image_stack(),

mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::make_internal_1Dsum_↩
estimator(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_↩
position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss2DsModel::make_prior_normal↩
_position(), mappel::methods::model_image(), mappel::ImageFormat2DBase::operator=(), mappel::methods↩
::likelihood::rllh(), mappel::methods::likelihood::debug::rllh_components(), mappel::ImageFormat2DBase::set_↩
size(), mappel::Gauss2DModel::set_size(), mappel::Gauss2DsModel::set_size(), mappel::methods::simulate_image(),
mappel::methods::simulate_image_from_model(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss2Ds↩
Model::Stencil::Stencil(), mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2Ds↩
Model::update_internal_1Dsum_estimators().

8.19.5.23 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel↩
::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta↩
_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(),
mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel↩
::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::Point↩
EmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.19.5.24 Gauss1DsMAP mappel::Gauss2DsxyModel::x_model [protected]

X-model fits 2D images X-axis (column sum). Using variable sigma 1D model.

Definition at line 114 of file Gauss2DsxyModel.h.

8.19.5.25 Gauss1DsMAP mappel::Gauss2DsxyModel::y_model [protected]

Y-model fits 2D images Y-axis (row sum). Using variable sigma 1D model.

Definition at line 115 of file Gauss2DsxyModel.h.

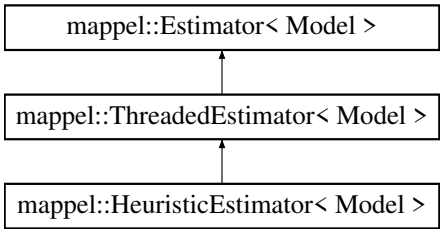
The documentation for this class was generated from the following file:

- Gauss2DsxyModel.h

8.20 mappel::HeuristicEstimator< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::HeuristicEstimator< Model >:



Public Member Functions

- HeuristicEstimator (Model &model)
- std::string name () const
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩ stack, VecT &rllh_stack, CubeT &obsI_stack)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_↩ parameters)
- StatsT get_stats ()
- StatsT get_debug_stats ()
- void clear_stats ()
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)

Protected Member Functions

- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- virtual StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- virtual void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.20.1 Detailed Description

template<class Model>
class mappel::HeuristicEstimator< Model >

Definition at line 133 of file estimator.h.

8.20.2 Constructor & Destructor Documentation

8.20.2.1 template<class Model > mappel::HeuristicEstimator< Model >::HeuristicEstimator (Model & *model*) [inline]

Definition at line 135 of file estimator.h.

8.20.3 Member Function Documentation

8.20.3.1 template<class Model > void mappel::ThreadedEstimator< Model >::clear_stats ( ) [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 287 of file estimator_impl.h.

References mappel::cgauss_heuristic_compute_estimate(), mappel::Estimator< Model >::clear_stats(), mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, and mappel::methods::objective::rllh().

Referenced by mappel::IterativeMaximizer< Model >::clear_stats().

8.20.3.2 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamT< Model > & *theta_est*, double & *rllh*, MatT & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.20.3.3 template<class Model > StencilT< Model > mappel::Estimator< Model >::compute_estimate_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamVecT< Model > & *sequence,* VecT & *sequence_rllh*) [inline], [protected], [virtual], [inherited]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented in mappel::IterativeMaximizer< Model >, mappel::SimulatedAnnealingMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 192 of file estimator_impl.h.

Referenced by mappel::CGaussMLE< Model >::name(), mappel::SimulatedAnnealingMaximizer< Model >::↩ SimulatedAnnealingMaximizer(), and mappel::Estimator< Model >::~Estimator().

8.20.3.4 template<class Model > void mappel::Estimator< Model >::compute_profile_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* const IdxVecT & *fixed_parameters,* ParamT< Model > & *theta_est,* double & *rllh*) [protected], [virtual], [inherited]

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 151 of file estimator_impl.h.

References mappel::Estimator< Model >::name().

Referenced by mappel::Estimator< Model >::~Estimator().

8.20.3.5 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.20.3.6 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.20.3.7 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.20.3.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.20.3.9 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.20.3.10 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.20.3.11 template<class Model > void mappel::Estimator< Model >::estimate_max_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI,* MatT & *sequence,* VecT & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.20.3.12 template<class Model > void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack,* ParamVecT< Model > & *theta_est_stack,* VecT & *rllh_stack,* CubeT & *obsI_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.20.3.13 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im,* const ParamVecT< Model > & *theta_init,* ParamVecT< Model > & *theta,* VecT & *rllh,* CubeT & *obsI*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.20.3.14 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_profile_stack (const ModelDataT< Model > & *data,* const IdxVecT & *fixed_parameters,* const MatT & *values,* const ParamVecT< Model > & *theta_init,* VecT & *profile_likelihood,* ParamVecT< Model > & *profile_parameters*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.20.3.15 template<class Model > StatsT mappel::ThreadedEstimator< Model >::get_debug_stats ( ) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 281 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::get_stats().

8.20.3.16 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.20.3.17 template<class Model > StatsT mappel::ThreadedEstimator< Model >::get_stats ( ) [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 271 of file estimator_impl.h.

References mappel::Estimator< Model >::get_stats(), mappel::Estimator< Model >::num_estimations, mappel::ThreadedEstimator< Model >::num_threads, and mappel::Estimator< Model >::total_walltime.

Referenced by mappel::ThreadedEstimator< Model >::get_debug_stats(), mappel::CGaussMLE< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.20.3.18 template<class Model > std::string mappel::HeuristicEstimator< Model >::name ( ) const [inline], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 137 of file estimator.h.

References mappel::Estimator< Model >::compute_estimate(), and mappel::methods::objective::rllh().

8.20.3.19 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.20.3.20 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.20.4 Member Data Documentation

8.20.4.1 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected], [inherited]

Definition at line 127 of file estimator.h.

8.20.4.2 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.20.4.3 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected], [inherited]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.20.4.4 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.20.4.5 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected], [inherited]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.20.4.6 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

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

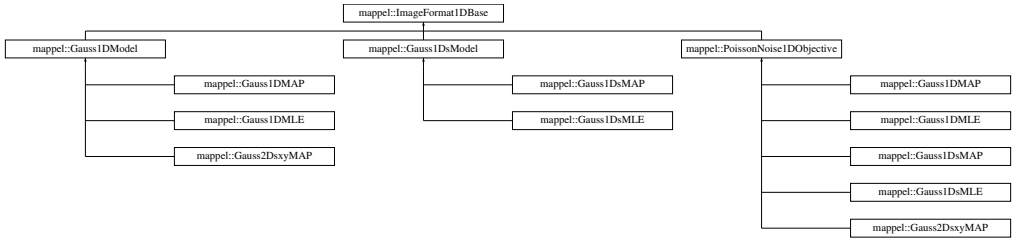
- estimator.h
- estimator_impl.h

8.21 mappel::ImageFormat1DBase Class Reference

A virtual base class for 2D image localization objectives.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/ImageFormat1DBase.h>`

Inheritance diagram for mappel::ImageFormat1DBase:



Public Types

- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = CoordT
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Col< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Col< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Mat< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >

Public Member Functions

- StatsT get_stats () const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- ImageSizeT get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void set_size (const arma::Col< ImageCoordT > &sz)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.

Static Public Member Functions

- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const ImageCoordT num_dim = 1
- static const ImageCoordT global_min_size = 3
- static const ImageCoordT global_max_size = 512

Protected Member Functions

- ImageFormat1DBase ()=default
- ImageFormat1DBase (ImageSizeT size_)

Protected Attributes

- ImageSizeT size

8.21.1 Detailed Description

A virtual base class for 2D image localization objectives.

This class should be inherited virtually by both the model and the objective so that the common image information and functions are available in both Model and Objective classes hierarchies

Definition at line 23 of file ImageFormat1DBase.h.

8.21.2 Member Typedef Documentation

8.21.2.1 using mappel::ImageFormat1DBase::ImageCoordT = uint32_t

Image size coordinate storage type

Definition at line 25 of file ImageFormat1DBase.h.

8.21.2.2 using mappel::ImageFormat1DBase::ImagePixelT = double

Image pixel storage type

Definition at line 26 of file ImageFormat1DBase.h.

8.21.2.3 template<class PixelT > using mappel::ImageFormat1DBase::ImageShapeT = arma::Col<PixelT>

Shape of the data type for a single image

Definition at line 33 of file ImageFormat1DBase.h.

8.21.2.4 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeShapeT = CoordT

Shape of the data type to store 1-image's coordinates

Definition at line 28 of file ImageFormat1DBase.h.

8.21.2.5 using mappel::ImageFormat1DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT>

Data type for a single image size

Definition at line 30 of file ImageFormat1DBase.h.

8.21.2.6 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeVecShapeT = arma::Col<CoordT>

Shape of the data type to store a vector of image's coordinates

Definition at line 29 of file ImageFormat1DBase.h.

8.21.2.7 using mappel::ImageFormat1DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT>

Data type for a sequence of image sizes

Definition at line 31 of file ImageFormat1DBase.h.

8.21.2.8 template<class PixelT > using mappel::ImageFormat1DBase::ImageStackShapeT = arma::Mat<PixelT>

Shape of the data type for a sequence of images

Definition at line 34 of file ImageFormat1DBase.h.

8.21.2.9 using mappel::ImageFormat1DBase::ImageStackT = ImageStackShapeT<ImagePixelT>

Data type to represent a sequence of images

Definition at line 36 of file ImageFormat1DBase.h.

8.21.2.10 using mappel::ImageFormat1DBase::ImageT = ImageShapeT<ImagePixelT>

Data type to represent single image

Definition at line 35 of file ImageFormat1DBase.h.

8.21.3 Constructor & Destructor Documentation

8.21.3.1 mappel::ImageFormat1DBase::ImageFormat1DBase ( ) [protected], [default]

8.21.3.2 ImageFormat1DBase::ImageFormat1DBase (ImageSizeT *size_*) [explicit], [protected]

Definition at line 13 of file ImageFormat1DBase.cpp.

References check_size().

8.21.4 Member Function Documentation

8.21.4.1 void ImageFormat1DBase::check_image_shape (const ImageT & *im*) const

Check the shape of a single images is correct for model size.

Definition at line 59 of file ImageFormat1DBase.cpp.

References size.

8.21.4.2 void ImageFormat1DBase::check_image_shape (const ImageStackT & *ims*) const

Check the shape of a stack of images is correct for model size.

Definition at line 71 of file ImageFormat1DBase.cpp.

References size.

8.21.4.3 void ImageFormat1DBase::check_size (const ImageSizeT & *size_*) [static]

Check the size argument for the model.

Definition at line 39 of file ImageFormat1DBase.cpp.

References global_max_size, and global_min_size.

Referenced by ImageFormat1DBase(), and set_size().

8.21.4.4 ImageFormat1DBase::ImageT ImageFormat1DBase::get_image_from_stack (const ImageStackT & *stack*, ImageCoordT *n*) const [inline]

Definition at line 108 of file ImageFormat1DBase.h.

8.21.4.5 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_num_pixels ( ) const [inline]

Definition at line 82 of file ImageFormat1DBase.h.

References size.

Referenced by get_stats().

8.21.4.6 ImageFormat1DBase::ImageSizeT ImageFormat1DBase::get_size ( ) const [inline]

Definition at line 71 of file ImageFormat1DBase.h.

References size.

Referenced by get_stats().

8.21.4.7 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size (IdxT *idx*) const

Definition at line 20 of file ImageFormat1DBase.cpp.

References size.

8.21.4.8 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline]

Definition at line 101 of file ImageFormat1DBase.h.

8.21.4.9 StatsT ImageFormat1DBase::get_stats ( ) const

Definition at line 81 of file ImageFormat1DBase.cpp.

References get_num_pixels(), get_size(), and num_dim.

Referenced by mappel::Gauss1DModel::get_stats(), and mappel::Gauss1DsModel::get_stats().

8.21.4.10 ImageFormat1DBase::ImageT ImageFormat1DBase::make_image ( ) const [inline]

Definition at line 87 of file ImageFormat1DBase.h.

References size.

8.21.4.11 ImageFormat1DBase::ImageStackT ImageFormat1DBase::make_image_stack (ImageCoordT *n*) const [inline]

Definition at line 94 of file ImageFormat1DBase.h.

References size.

8.21.4.12 template<class ImT > void ImageFormat1DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const

Definition at line 115 of file ImageFormat1DBase.h.

8.21.4.13 void ImageFormat1DBase::set_size (const ImageSizeT & *size_*)

Definition at line 30 of file ImageFormat1DBase.cpp.

References check_size(), and size.

Referenced by set_size(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2DsModel::set_size().

8.21.4.14 void ImageFormat1DBase::set_size (const arma::Col< ImageCoordT > & *sz*) [inline]

Definition at line 75 of file ImageFormat1DBase.h.

References set_size().

8.21.5 Member Data Documentation

8.21.5.1 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_max_size = 512 [static]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 40 of file ImageFormat1DBase.h.

Referenced by check_size().

8.21.5.2 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_min_size = 3 [static]

Minimum size along any dimension of the image.

Definition at line 39 of file ImageFormat1DBase.h.

Referenced by check_size().

8.21.5.3 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::num_dim = 1 [static]

Number of image dimensions.

Definition at line 38 of file ImageFormat1DBase.h.

Referenced by get_stats().

8.21.5.4 ImageSizeT mappel::ImageFormat1DBase::size [protected]

Number of pixels in X dimension for 1D image

Definition at line 65 of file ImageFormat1DBase.h.

Referenced by check_image_shape(), mappel::Gauss1DsModel::Stencil::compute_derivatives(), mappel::Gauss1D↩ Model::Stencil::compute_derivatives(), get_num_pixels(), get_size(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), make_image(), make_image_stack(), set_size(), mappel::Gauss1↩ DsModel::Stencil::Stencil(), and mappel::Gauss1DModel::Stencil::Stencil().

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

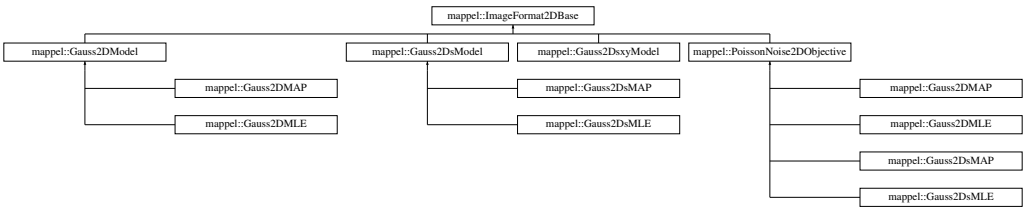
- ImageFormat1DBase.h
- ImageFormat1DBase.cpp

8.22 mappel::ImageFormat2DBase Class Reference

A virtual base class for 2D image localization objectives.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/ImageFormat2D↩ Base.h>`

Inheritance diagram for mappel::ImageFormat2DBase:



Public Types

- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = arma::Col< CoordT >
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Mat< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Mat< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Cube< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >

Public Member Functions

- StatsT get_stats () const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- const ImageSizeT & get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.

Static Public Member Functions

- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const ImageCoordT num_dim =2
- static const ImageCoordT global_min_size =3
- static const ImageCoordT global_max_size =512

Protected Member Functions

- ImageFormat2DBase ()=default
- ImageFormat2DBase (const ImageSizeT &size)
- ImageFormat2DBase (const ImageFormat2DBase &)
- ImageFormat2DBase (ImageFormat2DBase &&)
- ImageFormat2DBase & operator= (const ImageFormat2DBase &)
- ImageFormat2DBase & operator= (ImageFormat2DBase &&)

Protected Attributes

- ImageSizeT size

8.22.1 Detailed Description

A virtual base class for 2D image localization objectives.

This class should be inherited virtually by both the model and the objective so that the common image information and functions are available in both Model and Objective classes hierarchies

Definition at line 22 of file ImageFormat2DBase.h.

8.22.2 Member Typedef Documentation

8.22.2.1 using mappel::ImageFormat2DBase::ImageCoordT = uint32_t

Image size coordinate storage type

Definition at line 24 of file ImageFormat2DBase.h.

8.22.2.2 using mappel::ImageFormat2DBase::ImagePixelT = double

Image pixel storage type

Definition at line 25 of file ImageFormat2DBase.h.

8.22.2.3 template<class PixelT > using mappel::ImageFormat2DBase::ImageShapeT = arma::Mat<PixelT>

Shape of the data type for a single image

Definition at line 32 of file ImageFormat2DBase.h.

8.22.2.4 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeShapeT = arma::Col<CoordT>

Shape of the data type to store a single image's coordinates

Definition at line 27 of file ImageFormat2DBase.h.

8.22.2.5 using mappel::ImageFormat2DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT>

Data type for a single image size

Definition at line 29 of file ImageFormat2DBase.h.

8.22.2.6 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeVecShapeT = arma::Mat<CoordT>

Shape of the data type to store a vector of image's coordinates

Definition at line 28 of file ImageFormat2DBase.h.

8.22.2.7 using mappel::ImageFormat2DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT>

Data type for a sequence of image sizes

Definition at line 30 of file ImageFormat2DBase.h.

8.22.2.8 template<class PixelT > using mappel::ImageFormat2DBase::ImageStackShapeT = arma::Cube<PixelT>

Shape of the data type for a sequence of images

Definition at line 33 of file ImageFormat2DBase.h.

8.22.2.9 using mappel::ImageFormat2DBase::ImageStackT = ImageStackShapeT<ImagePixelT>

Data type to represent a sequence of images

Definition at line 35 of file ImageFormat2DBase.h.

8.22.2.10 using mappel::ImageFormat2DBase::ImageT = ImageShapeT<ImagePixelT>

Data type to represent single image

Definition at line 34 of file ImageFormat2DBase.h.

8.22.3 Constructor & Destructor Documentation

8.22.3.1 mappel::ImageFormat2DBase::ImageFormat2DBase ( ) [protected], [default]

8.22.3.2 mappel::ImageFormat2DBase::ImageFormat2DBase (const ImageSizeT & *size*) [explicit], [protected]

Definition at line 13 of file ImageFormat2DBase.cpp.

References check_size().

8.22.3.3 mappel::ImageFormat2DBase::ImageFormat2DBase (const ImageFormat2DBase & *o*) [protected]

Definition at line 19 of file ImageFormat2DBase.cpp.

8.22.3.4 mappel::ImageFormat2DBase::ImageFormat2DBase (ImageFormat2DBase && *o*) [protected]

Definition at line 23 of file ImageFormat2DBase.cpp.

8.22.4 Member Function Documentation

8.22.4.1 void mappel::ImageFormat2DBase::check_image_shape (const ImageT & *im*) const

Check the shape of a single images is correct for model size.

Definition at line 80 of file ImageFormat2DBase.cpp.

References size.

8.22.4.2 void mappel::ImageFormat2DBase::check_image_shape (const ImageStackT & *ims*) const

Check the shape of a stack of images is correct for model size.

Definition at line 93 of file ImageFormat2DBase.cpp.

References size.

8.22.4.3 void mappel::ImageFormat2DBase::check_size (const ImageSizeT & *size_*) [static]

Check the size argument for the model.

Definition at line 60 of file ImageFormat2DBase.cpp.

References global_max_size, and global_min_size.

Referenced by ImageFormat2DBase(), and set_size().

8.22.4.4 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline]

Definition at line 106 of file ImageFormat2DBase.h.

8.22.4.5 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_num_pixels ( ) const [inline]

Definition at line 79 of file ImageFormat2DBase.h.

References size.

Referenced by get_stats().

8.22.4.6 const ImageFormat2DBase::ImageSizeT & mappel::ImageFormat2DBase::get_size ( ) const [inline]

Definition at line 74 of file ImageFormat2DBase.h.

References size.

8.22.4.7 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size (IdxT *idx*) const

Definition at line 41 of file ImageFormat2DBase.cpp.

References size.

8.22.4.8 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline]

Definition at line 99 of file ImageFormat2DBase.h.

8.22.4.9 StatsT mappel::ImageFormat2DBase::get_stats ( ) const

Definition at line 103 of file ImageFormat2DBase.cpp.

References get_num_pixels(), num_dim, and size.

Referenced by mappel::Gauss2DModel::get_stats(), and mappel::Gauss2DsModel::get_stats().

8.22.4.10 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::make_image ( ) const [inline]

Definition at line 85 of file ImageFormat2DBase.h.

References size.

8.22.4.11 ImageFormat2DBase::ImageStackT mappel::ImageFormat2DBase::make_image_stack (ImageCoordT *n*) const [inline]

Definition at line 92 of file ImageFormat2DBase.h.

References size.

8.22.4.12 ImageFormat2DBase & mappel::ImageFormat2DBase::operator= (const ImageFormat2DBase & *o*) [protected]

Definition at line 27 of file ImageFormat2DBase.cpp.

References size.

Referenced by mappel::Gauss2DsMAP::operator=(), mappel::Gauss2DsMLE::operator=(), mappel::Gauss2DMAP↩ ::operator=(), and mappel::Gauss2DMLE::operator=().

8.22.4.13 ImageFormat2DBase & mappel::ImageFormat2DBase::operator= (ImageFormat2DBase && *o*) [protected]

Definition at line 33 of file ImageFormat2DBase.cpp.

References size.

8.22.4.14 template<class ImT > void mappel::ImageFormat2DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const

Definition at line 113 of file ImageFormat2DBase.h.

8.22.4.15 void mappel::ImageFormat2DBase::set_size (const ImageSizeT & *size_*)

Definition at line 51 of file ImageFormat2DBase.cpp.

References check_size(), and size.

Referenced by mappel::Gauss2DModel::set_size(), and mappel::Gauss2DsModel::set_size().

8.22.5 Member Data Documentation

8.22.5.1 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_max_size =512 [static]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 39 of file ImageFormat2DBase.h.

Referenced by check_size().

8.22.5.2 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_min_size =3 [static]

Minimum size along any dimension of the image.

Definition at line 38 of file ImageFormat2DBase.h.

Referenced by check_size().

8.22.5.3 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::num_dim =2 [static]

Number of image dimensions.

Definition at line 37 of file ImageFormat2DBase.h.

Referenced by get_stats().

8.22.5.4 ImageSizeT mappel::ImageFormat2DBase::size [protected]

Number of pixels in X dimension for 1D image

Definition at line 67 of file ImageFormat2DBase.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss_heuristic_compute_estimate(), check_image_shape(), mappel::Gauss2DModel::Stencil::compute_derivatives(), mappel::Gauss2DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::methods::expected_information(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsMAP::Gauss2DsMAP(), mappel::Gauss2DsMLE::Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), get_num_pixels(), get_size(), get_stats(), mappel::methods::likelihood::grad(), mappel::methods::likelihood::grad2(), mappel::methods::likelihood::debug::grad_components(), mappel::methods::likelihood::hessian(), mappel::methods::likelihood::debug::hessian_components(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), make_image(), make_image_stack(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss2DsModel::make_prior_normal_position(), mappel::methods::model_image(), operator=(), mappel::methods::likelihood::rllh(), mappel::methods::likelihood::debug::rllh_components(), set_size(), mappel::Gauss2DModel::set_size(), mappel::Gauss2DsModel::set_size(), mappel::methods::simulate_image(), mappel::methods::simulate_image_from_model(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss2DsModel::Stencil::Stencil(), mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

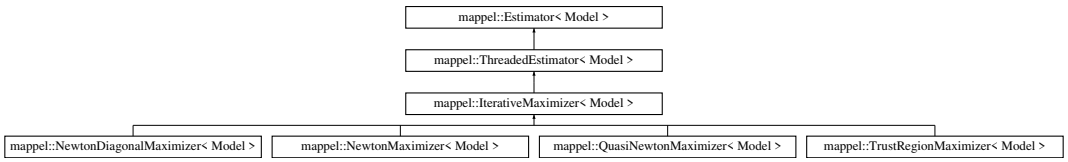
The documentation for this class was generated from the following files:

- ImageFormat2DBase.h
- ImageFormat2DBase.cpp

8.23 mappel::IterativeMaximizer< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::IterativeMaximizer< Model >:



Classes

- class MaximizerData

Public Types

- enum ExitCode : IdxT {
  ExitCode::Unassigned = 99, ExitCode::MaxIter = 6, ExitCode::MaxBacktracks = 5, ExitCode::TrustRegionRadius = 4,
  ExitCode::GradRatio = 3, ExitCode::FunctionChange = 2, ExitCode::StepSize = 1, ExitCode::Error = 0 }

Public Member Functions

- IterativeMaximizer (Model &model, int max_iterations=DEFAULT_ITERATIONS)
- double mean_iterations ()
- double mean_backtracks ()
- double mean_fun_evals ()
- double mean_der_evals ()
- StatsT get_stats ()
- StatsT get_debug_stats ()
- void clear_stats ()
- void local_maximize (const ModelDataT< Model > &im, const StencilT< Model > &theta_init, StencilT< Model > &stencil, double &rllh)

  Perform a local maximization to finish off a simulated annealing run.
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩ stack, VecT &rllh_stack, CubeT &obsI_stack)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_↩ parameters)
- virtual std::string name () const =0
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)

Static Public Attributes

- static constexpr int NumExitCodes = 7

Protected Member Functions

- void record_run_statistics (const MaximizerData &data)
- StencilT< Model > compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- virtual void maximize (MaximizerData &data)=0
- bool backtrack (MaximizerData &data)
- bool convergence_test (MaximizerData &data)
- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- int max_iterations
- double epsilon = sqrt(std::numeric_limits<double>::epsilon())
- double delta = sqrt(std::numeric_limits<double>::epsilon())
- double lambda_min = 0.05
- double alpha = 1e-4
- int max_backtracks = 8
- int total_iterations = 0
- int total_backtracks = 0
- int total_fun_evals = 0
- int total_der_evals = 0
- IdxVecT exit_counts
- IdxVecT last_backtrack_idxs
- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.23.1 Detailed Description

template<class Model>
class mappel::IterativeMaximizer< Model >

Definition at line 195 of file estimator.h.

8.23.2 Member Enumeration Documentation

8.23.2.1 template<class Model > enum mappel::IterativeMaximizer::ExitCode : IdxT [strong]

Enumerator

Unassigned

MaxIter

MaxBacktracks

TrustRegionRadius

GradRatio

FunctionChange

StepSize

Error

Definition at line 198 of file estimator.h.

8.23.3 Constructor & Destructor Documentation

8.23.3.1 template<class Model > mappel::IterativeMaximizer< Model >::IterativeMaximizer (Model & *model,* int *max_iterations* = DEFAULT_ITERATIONS)

Definition at line 391 of file estimator_impl.h.

8.23.4 Member Function Documentation

8.23.4.1 template<class Model > bool mappel::IterativeMaximizer< Model >::backtrack (MaximizerData & *data*) [protected]

Definition at line 530 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::alpha, mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::im, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration(), mappel::IterativeMaximizer< Model >::MaximizerData::restore_stencil(), mappel::methods::objective::rllh(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::save_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::MaximizerData::set_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::step.

Referenced by mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.23.4.2 template<class Model > void mappel::IterativeMaximizer< Model >::clear_stats ( ) [virtual]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 504 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::exit_counts, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::IterativeMaximizer< Model >::total_iterations.

8.23.4.3 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.23.4.4 template<class Model > StencilT< Model > mappel::IterativeMaximizer< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [protected], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 628 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::print_image(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.23.4.5 template<class Model > StencilT< Model > mappel::IterativeMaximizer< Model >::compute_estimate_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamVecT< Model > & *sequence,* VecT & *sequence_rllh*) [protected], [virtual]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented from mappel::Estimator< Model >.

Definition at line 653 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence_rllh(), mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

8.23.4.6 template<class Model > void mappel::IterativeMaximizer< Model >::compute_profile_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* const IdxVecT & *fixed_parameters,* ParamT< Model > & *theta_est,* double & *rllh*) [protected], [virtual]

Reimplemented from mappel::Estimator< Model >.

Definition at line 672 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::set_fixed_parameters(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.23.4.7 template<class Model > bool mappel::IterativeMaximizer< Model >::convergence_test (MaximizerData & *data*) [protected]

Definition at line 606 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::StepSize, and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.23.4.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.23.4.9 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.23.4.10 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.23.4.11 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.23.4.12 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.23.4.13 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.23.4.14 template<class Model > void mappel::Estimator< Model >::estimate_max_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI,* MatT & *sequence,* VecT & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.23.4.15 template<class Model > void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack,* ParamVecT< Model > & *theta_est_stack,* VecT & *rllh_stack,* CubeT & *obsI_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.23.4.16 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im,* const ParamVecT< Model > & *theta_init,* ParamVecT< Model > & *theta,* VecT & *rllh,* CubeT & *obsI*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.23.4.17 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_profile_stack (const ModelDataT< Model > & *data,* const IdxVecT & *fixed_parameters,* const MatT & *values,* const ParamVecT< Model > & *theta_init,* VecT & *profile_likelihood,* ParamVecT< Model > & *profile_parameters*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.23.4.18 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_debug_stats ( ) [virtual]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 488 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::backtrack_idxs, mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::last_backtrack_idxs.

8.23.4.19 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.23.4.20 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_stats ( ) [virtual]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 459 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::ThreadedEstimator< Model >::get_stats(), mappel::IterativeMaximizer< Model >::GradRatio, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::IterativeMaximizer< Model >::MaxIter, mappel::ThreadedEstimator< Model >::mtx, mappel::Estimator< Model >::num_estimations, mappel::IterativeMaximizer< Model >::StepSize, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, mappel::IterativeMaximizer< Model >::total_iterations, and mappel::IterativeMaximizer< Model >::TrustRegionRadius.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats().

8.23.4.21 template<class Model > void mappel::IterativeMaximizer< Model >::local_maximize (const ModelDataT< Model > & *im,* const StencilT< Model > & *theta_init,* StencilT< Model > & *stencil,* double & *rllh*)

Perform a local maximization to finish off a simulated annealing run.

Definition at line 690 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::rllh, and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal().

8.23.4.22 template<class Model > virtual void mappel::IterativeMaximizer< Model >::maximize (MaximizerData & *data*) [protected], [pure virtual]

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), and mappel::IterativeMaximizer< Model >::local_maximize().

8.23.4.23 template<class Model > double mappel::IterativeMaximizer< Model >::mean_backtracks ( )

8.23.4.24 template<class Model > double mappel::IterativeMaximizer< Model >::mean_der_evals ( )

8.23.4.25 template<class Model > double mappel::IterativeMaximizer< Model >::mean_fun_evals ( )

8.23.4.26 template<class Model > double mappel::IterativeMaximizer< Model >::mean_iterations ( )

8.23.4.27 template<class Model > virtual std::string mappel::Estimator< Model >::name ( ) const [pure virtual], [inherited]

Implemented in mappel::TrustRegionMaximizer< Model >, mappel::QuasiNewtonMaximizer< Model >, mappel::NewtonMaximizer< Model >, mappel::NewtonDiagonalMaximizer< Model >, mappel::SimulatedAnnealingMaximizer< Model >, mappel::CGaussMLE< Model >, mappel::CGaussHeuristicEstimator< Model >, and mappel::HeuristicEstimator< Model >.

Referenced by mappel::Estimator< Model >::compute_profile_estimate(), and mappel::Estimator< Model >::~Estimator().

8.23.4.28 template<class Model > void mappel::IterativeMaximizer< Model >::record_run_statistics (const MaximizerData & *data*) [protected]

Definition at line 517 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::exit_code, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::MaximizerData::get_backtrack_idxs(), mappel::IterativeMaximizer< Model >::last_backtrack_idxs, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::MaximizerData::nBacktracks, mappel::IterativeMaximizer< Model >::MaximizerData::nIterations, mappel::IterativeMaximizer< Model >::MaximizerData::save_seq, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::IterativeMaximizer< Model >::total_iterations.

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::compute_profile_estimate().

8.23.4.29 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.23.4.30 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.23.5 Member Data Documentation

8.23.5.1 template<class Model > double mappel::IterativeMaximizer< Model >::alpha = 1e-4 [protected]

Definition at line 232 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), and mappel::TrustRegionMaximizer< Model >::bound_step().

8.23.5.2 template<class Model > double mappel::IterativeMaximizer< Model >::delta = sqrt(std::numeric_limits<double>::epsilon()) [protected]

Definition at line 229 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.23.5.3 template<class Model > double mappel::IterativeMaximizer< Model >::epsilon = sqrt(std::numeric_limits<double>::epsilon()) [protected]

Definition at line 228 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton().

8.23.5.4 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::exit_counts [protected]

Definition at line 240 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.23.5.5 template<class Model > double mappel::IterativeMaximizer< Model >::lambda_min = 0.05 [protected]

Definition at line 231 of file estimator.h.

Referenced by mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.23.5.6 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::last_backtrack_idxs [protected]

Definition at line 242 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.23.5.7 template<class Model > int mappel::IterativeMaximizer< Model >::max_backtracks = 8 [protected]

Definition at line 233 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::get_stats().

8.23.5.8 template<class Model > int mappel::IterativeMaximizer< Model >::max_iterations [protected]

Definition at line 225 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.23.5.9 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected], [inherited]

Definition at line 127 of file estimator.h.

8.23.5.10 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.23.5.11 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected], [inherited]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.23.5.12 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.23.5.13 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected], [inherited]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.23.5.14 template<class Model > constexpr int mappel::IterativeMaximizer< Model >::NumExitCodes = 7 [static]

Definition at line 197 of file estimator.h.

8.23.5.15 template<class Model > int mappel::IterativeMaximizer< Model >::total_backtracks = 0 [protected]

Definition at line 237 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.23.5.16 template<class Model > int mappel::IterativeMaximizer< Model >::total_der_evals = 0 [protected]

Definition at line 239 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.23.5.17 template<class Model > int mappel::IterativeMaximizer< Model >::total_fun_evals = 0 [protected]

Definition at line 238 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.23.5.18 template<class Model > int mappel::IterativeMaximizer< Model >::total_iterations = 0 [protected]

Definition at line 236 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.23.5.19 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

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

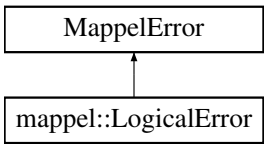
- estimator.h
- estimator_impl.h

8.24 mappel::LogicalError Struct Reference

Failure of code or algorithm logic.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/util.h>`

Inheritance diagram for mappel::LogicalError:



Public Member Functions

- LogicalError (std::string message)

8.24.1 Detailed Description

Failure of code or algorithm logic.

Definition at line 100 of file util.h.

8.24.2 Constructor & Destructor Documentation

8.24.2.1 mappel::LogicalError::LogicalError (std::string *message*) [inline]

Definition at line 102 of file util.h.

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

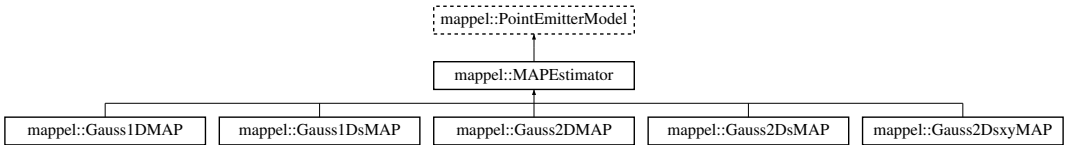
- util.h

8.25 mappel::MAPEstimator Class Reference

A Mixin class to configure a for MLE estimation (null prior).

`#include </home/travis/build/markjolah/Mappel/include/Mappel/MAPEstimator.h>`

Inheritance diagram for mappel::MAPEstimator:



Public Types

- using ParamT = arma::vec
- using ParamVecT = arma::mat

Public Member Functions

- StatsT get_stats () const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const

- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const

Static Public Member Functions

- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()

Static Public Attributes

- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2

Protected Member Functions

- MAPEstimator ()
- MAPEstimator (const MAPEstimator &o)
- MAPEstimator (MAPEstimator &&o)
- MAPEstimator & operator= (const MAPEstimator &o)
- MAPEstimator & operator= (MAPEstimator &&o)

Protected Attributes

- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound

8.25.1 Detailed Description

A Mixin class to configure a for MLE estimation (null prior).

Inheriting from this class modifies the objective function undergoing optimization to use a Null prior, by simply ignoreing the effect of the prior on the objective. This which effectively turns the objective function into a pure likelihood function, and the estimator becomes an MLE estimator.

Definition at line 22 of file MAPEstimator.h.

8.25.2 Member Typedef Documentation

8.25.2.1 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.25.2.2 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.25.3 Constructor & Destructor Documentation

8.25.3.1 mappel::MAPEstimator::MAPEstimator ( ) [inline], [protected]

Definition at line 24 of file MAPEstimator.h.

8.25.3.2 mappel::MAPEstimator::MAPEstimator (const MAPEstimator & *o*) [inline], [protected]

Definition at line 25 of file MAPEstimator.h.

8.25.3.3 mappel::MAPEstimator::MAPEstimator (MAPEstimator && *o*) [inline], [protected]

Definition at line 26 of file MAPEstimator.h.

8.25.4 Member Function Documentation

8.25.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.25.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.25.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.25.4.4 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.25.4.5 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.25.4.6 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.25.4.7 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.25.4.8 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.9 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.10 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.25.4.11 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.12 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.25.4.13 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.25.4.14 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.25.4.15 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.16 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.25.4.17 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.18 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.25.4.19 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.25.4.20 StatsT mappel::PointEmitterModel::get_stats ( ) const [inherited]

Definition at line 124 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, mappel::rng_manager, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DModel::get_stats(), mappel::Gauss1DsModel::get_stats(), mappel::Gauss2DModel::get_stats(), and mappel::Gauss2DsModel::get_stats().

8.25.4.21 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.25.4.22 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.23 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.25.4.24 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.25.4.25 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.25.4.26 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.25.4.27 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.25.4.28 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.25.4.29 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.25.4.30 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.25.4.31 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.25.4.32 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size*, double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.25.4.33 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size*, double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.25.4.34 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma*, double *max_sigma*, double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.25.4.35 MAPEstimator& mappel::MAPEstimator::operator= (const MAPEstimator & *o*) [inline], [protected]

Definition at line 27 of file MAPEstimator.h.

Referenced by mappel::Gauss1DMAP::operator=(), mappel::Gauss1DsMAP::operator=(), mappel::Gauss2DsMAP↩ ::operator=(), and mappel::Gauss2DMAP::operator=().

8.25.4.36 MAPEstimator& mappel::MAPEstimator::operator= (MAPEstimator && *o*) [inline], [protected]

Definition at line 28 of file MAPEstimator.h.

8.25.4.37 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩ EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.25.4.38 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.25.4.39 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.40 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.41 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.25.4.42 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.25.4.43 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.44 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.45 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.25.4.46 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.25.4.47 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.25.4.48 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.25.4.49 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.25.4.50 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.25.4.51 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.25.4.52 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.25.4.53 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.25.5 Member Data Documentation

8.25.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2↩ DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.25.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.25.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.25.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.25.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.25.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.25.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.25.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.25.5.9 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.25.5.10 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.25.5.11 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.25.5.12 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.25.5.13 IdxT mappel::PointEmitterModel::num_hyperparams [protected],[inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.25.5.14 IdxT mappel::PointEmitterModel::num_params [protected],[inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.25.5.15 CompositeDist mappel::PointEmitterModel::prior [protected],[inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.25.5.16 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

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

- MAPEstimator.h

8.26 mappel::IterativeMaximizer< Model >::MaximizerData Class Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Public Member Functions

- MaximizerData (const Model &model, const ModelDataT< Model > &im, const StencilT< Model > &s, bool save_seq=false, int max_seq_len=0)
- void record_exit (ExitCode code)
- void record_iteration ()

  Record an iteration point (derivatives computed) Using the saved theta as the default.
- void record_iteration (const ParamT< Model > &accepted_theta)

  Record an iteration point (derivatives computed)
- void record_backtrack (double rejected_rllh)

  Record a backtracked point (no derivative computations performed) Using the saved theta as the default.
- void record_backtrack (const ParamT< Model > &rejected_theta, double rejected_rllh)

  Record a backtracked point (no derivative computations performed)
- ParamVecT< Model > get_theta_sequence () const

  Return the saved theta sequence.
- IdxVecT get_backtrack_idxs () const
- VecT get_theta_sequence_rllh () const
- StencilT< Model > & stencil ()

  Get the current stencil.
- void set_stencil (const StencilT< Model > &s)
- void save_stencil ()

  Save the current stencil to the single reserve spot. Overwrites any previously saved stencil. This is used to save a stencil when backtracking.
- void restore_stencil ()

  Restore the single reserved stencil to the current stencil spot. Overwrites any previously saved stencil. This is used to restore a last good iterate (and associated stencil data) when backtracking.
- StencilT< Model > & saved_stencil ()

  Get the saved stencil.
- ParamT< Model > & theta ()

  Get the current stencil's theta.
- ParamT< Model > & saved_theta ()

  Get the saved stencil's theta.
- int getIteration () const
- void set_fixed_parameters (const IdxVecT &fixed_parameters)

Public Attributes

- const ModelDataT< Model > & im
- ParamT< Model > grad
- ParamT< Model > step
- VecT lbound
- VecT ubound
- double rllh
- int nBacktracks =0
- int nIterations =0
- bool save_seq
- ExitCode exit_code =ExitCode::Unassigned
- VecT fixed_parameter_scalar
- bool has_fixed_parameters =false

Protected Attributes

- StencilT< Model > s0
- StencilT< Model > s1
- bool current_stencil
- ParamVecT< Model > theta_seq
- VecT seq_rllh
- IdxVecT backtrack_idxs
- int seq_len =0
- const int max_seq_len

8.26.1 Detailed Description

template<class Model>
class mappel::IterativeMaximizer< Model >::MaximizerData

Definition at line 244 of file estimator.h.

8.26.2 Constructor & Destructor Documentation

8.26.2.1 template<class Model > mappel::IterativeMaximizer< Model >::MaximizerData::MaximizerData (const Model & *model*, const ModelDataT< Model > & *im*, const StencilT< Model > & *s*, bool *save_seq* = `false`, int *max_seq_len* = `0`)

Definition at line 398 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::backtrack_idxs, mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration(), mappel::IterativeMaximizer< Model >::MaximizerData::seq_rllh, and mappel::IterativeMaximizer< Model >::MaximizerData::theta_seq.

8.26.3 Member Function Documentation

8.26.3.1 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::MaximizerData::get_backtrack_idxs ( ) const [inline]

Definition at line 270 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::record_run_statistics().

8.26.3.2 template<class Model > ParamVecT<Model> mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence ( ) const [inline]

Return the saved theta sequence.

Definition at line 269 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), and mappel::IterativeMaximizer< Model >::compute_estimate_debug().

8.26.3.3 template<class Model > VecT mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence_rllh ( ) const [inline]

Definition at line 271 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate_debug().

8.26.3.4 template<class Model > int mappel::IterativeMaximizer< Model >::MaximizerData::getIteration ( ) const [inline]

Definition at line 291 of file estimator.h.

8.26.3.5 template<class Model > void mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack (double *rejected_rllh*) [inline]

Record a backtracked point (no derivative computations performed) Using the saved theta as the default.

Definition at line 264 of file estimator.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack().

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), and mappel::IterativeMaximizer< Model >::↩ MaximizerData::record_backtrack().

8.26.3.6 template<class Model > void mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack (const ParamT< Model > & *rejected_theta,* double *rejected_rllh*)

Record a backtracked point (no derivative computations performed)

Definition at line 433 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::backtrack_idxs, mappel::IterativeMaximizer< Model >::MaximizerData::max_seq_len, mappel::IterativeMaximizer< Model >::MaximizerData::nBacktracks, mappel::IterativeMaximizer< Model >::MaximizerData::save_seq, mappel::IterativeMaximizer< Model >::Maximizer↩ Data::seq_len, mappel::IterativeMaximizer< Model >::MaximizerData::seq_rllh, and mappel::IterativeMaximizer< Model >::MaximizerData::theta_seq.

8.26.3.7 template<class Model > void mappel::IterativeMaximizer< Model >::MaximizerData::record_exit (ExitCode *code*)

Definition at line 446 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::exit_code.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), and mappel::IterativeMaximizer< Model >::convergence_test().

8.26.3.8 template<class Model > void mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration ( ) [inline]

Record an iteration point (derivatives computed) Using the saved theta as the default.

Definition at line 260 of file estimator.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration().

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::MaximizerData::MaximizerData(), and mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration().

8.26.3.9 template<class Model > void mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration (const ParamT< Model > & *accepted_theta*)

Record an iteration point (derivatives computed)

Definition at line 421 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::max_seq_len, mappel::IterativeMaximizer< Model >::MaximizerData::nIterations, mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::save_seq, mappel::IterativeMaximizer< Model >::MaximizerData::seq_len, mappel::IterativeMaximizer< Model >::MaximizerData::seq_rllh, and mappel::IterativeMaximizer< Model >::MaximizerData::theta_seq.

8.26.3.10 template<class Model > void mappel::IterativeMaximizer< Model >::MaximizerData::restore_stencil ( ) [inline]

Restore the single reserved stencil to the current stencil spot. Overwrites any previously saved stencil. This is used to restore a last good iterate (and associated stencil data) when backtracking.

Definition at line 284 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack().

8.26.3.11 template<class Model > void mappel::IterativeMaximizer< Model >::MaximizerData::save_stencil ( ) [inline]

Save the current stencil to the single reserve spot. Overwrites any previously saved stencil. This is used to save a stencil when backtracking.

Definition at line 279 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack().

8.26.3.12 template<class Model > StencilT<Model>& mappel::IterativeMaximizer< Model >::MaximizerData::saved_stencil ( ) [inline]

Get the saved stencil.

Definition at line 286 of file estimator.h.

8.26.3.13 template<class Model > ParamT<Model>& mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta ( ) [inline]

Get the saved stencil's theta.

Definition at line 290 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), and mappel::IterativeMaximizer< Model >::convergence_test().

8.26.3.14 template<class Model > void mappel::IterativeMaximizer< Model >::MaximizerData::set_fixed_parameters (const IdxVecT & *fixed_parameters*)

Definition at line 452 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, and mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters.

Referenced by mappel::IterativeMaximizer< Model >::compute_profile_estimate().

8.26.3.15 template<class Model > void mappel::IterativeMaximizer< Model >::MaximizerData::set_stencil (const StencilT< Model > & *s*) [inline]

Definition at line 274 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack().

8.26.3.16 template<class Model > StencilT<Model>& mappel::IterativeMaximizer< Model >::MaximizerData::stencil ( ) [inline]

Get the current stencil.

Definition at line 273 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::local_maximize().

8.26.3.17 template<class Model > ParamT<Model>& mappel::IterativeMaximizer< Model >::MaximizerData::theta ( ) [inline]

Get the current stencil's theta.

Definition at line 288 of file estimator.h.

Referenced by mappel::TrustRegionMaximizer< Model >::compute_bound_scaling_vec(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), and mappel::IterativeMaximizer< Model >::convergence_test().

8.26.4 Member Data Documentation

8.26.4.1 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::MaximizerData::backtrack_idxs [protected]

Definition at line 302 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats(), mappel::IterativeMaximizer< Model >::↩ MaximizerData::MaximizerData(), and mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack().

8.26.4.2 template<class Model > bool mappel::IterativeMaximizer< Model >::MaximizerData::current_stencil [protected]

Definition at line 298 of file estimator.h.

8.26.4.3 template<class Model > ExitCode mappel::IterativeMaximizer< Model >::MaximizerData::exit_code =ExitCode::Unassigned

Definition at line 254 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.26.4.4 template<class Model > VecT mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar

Definition at line 293 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >↩ ::convergence_test(), and mappel::IterativeMaximizer< Model >::MaximizerData::set_fixed_parameters().

8.26.4.5 template<class Model > ParamT<Model> mappel::IterativeMaximizer< Model >::MaximizerData::grad

Definition at line 247 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), and mappel::IterativeMaximizer< Model >↩ ::convergence_test().

8.26.4.6 template<class Model > bool mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters =false

Definition at line 294 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >↩ ::convergence_test(), and mappel::IterativeMaximizer< Model >::MaximizerData::set_fixed_parameters().

8.26.4.7 template<class Model > const ModelDataT<Model>& mappel::IterativeMaximizer< Model >::MaximizerData::im

Definition at line 246 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack().

8.26.4.8 template<class Model > VecT mappel::IterativeMaximizer< Model >::MaximizerData::lbound

Definition at line 249 of file estimator.h.

Referenced by mappel::TrustRegionMaximizer< Model >::compute_bound_scaling_vec().

8.26.4.9 template<class Model > const int mappel::IterativeMaximizer< Model >::MaximizerData::max_seq_len [protected]

Definition at line 304 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), and mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration().

8.26.4.10 template<class Model > int mappel::IterativeMaximizer< Model >::MaximizerData::nBacktracks =0

Definition at line 251 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.26.4.11 template<class Model > int mappel::IterativeMaximizer< Model >::MaximizerData::nIterations =0

Definition at line 252 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.26.4.12 template<class Model > double mappel::IterativeMaximizer< Model >::MaximizerData::rllh

Definition at line 250 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::local_maximize(), and mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration().

8.26.4.13 template<class Model > StencilT<Model> mappel::IterativeMaximizer< Model >::MaximizerData::s0 [protected]

Definition at line 297 of file estimator.h.

8.26.4.14 template<class Model > StencilT<Model> mappel::IterativeMaximizer< Model >::MaximizerData::s1 [protected]

Definition at line 297 of file estimator.h.

8.26.4.15 template<class Model > bool mappel::IterativeMaximizer< Model >::MaximizerData::save_seq

Definition at line 253 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.26.4.16 template<class Model > int mappel::IterativeMaximizer< Model >::MaximizerData::seq_len =0 [protected]

Definition at line 303 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), and mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration().

8.26.4.17 template<class Model > VecT mappel::IterativeMaximizer< Model >::MaximizerData::seq_rllh [protected]

Definition at line 301 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::MaximizerData::MaximizerData(), mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), and mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration().

8.26.4.18 template<class Model > ParamT<Model> mappel::IterativeMaximizer< Model >::MaximizerData::step

Definition at line 248 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), and mappel::TrustRegionMaximizer< Model >::bound_step().

8.26.4.19 template<class Model > ParamVecT<Model> mappel::IterativeMaximizer< Model >::MaximizerData::theta_seq [protected]

Definition at line 300 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::MaximizerData::MaximizerData(), mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), and mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration().

8.26.4.20 template<class Model > VecT mappel::IterativeMaximizer< Model >::MaximizerData::ubound

Definition at line 249 of file estimator.h.

Referenced by mappel::TrustRegionMaximizer< Model >::compute_bound_scaling_vec().

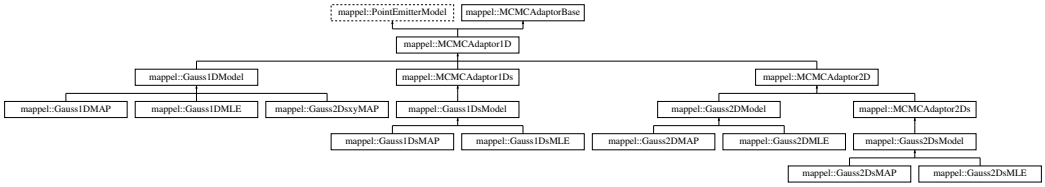
The documentation for this class was generated from the following files:

- estimator.h
- estimator_impl.h

8.27 mappel::MCMCAdaptor1D Class Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/MCMCAdaptor1D.h>`

Inheritance diagram for mappel::MCMCAdaptor1D:



Public Types

- using ParamT = arma::vec
- using ParamVecT = arma::mat

Public Member Functions

- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const

- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()

Static Public Attributes

- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300

- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5

Protected Member Functions

- MCMCAdaptor1D ()
- MCMCAdaptor1D (double sigma_scale)
- MCMCAdaptor1D (const MCMCAdaptor1D &o)
- MCMCAdaptor1D (MCMCAdaptor1D &&o)
- MCMCAdaptor1D & operator= (const MCMCAdaptor1D &o)
- MCMCAdaptor1D & operator= (MCMCAdaptor1D &&o)
- StatsT get_stats () const
- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- double eta_x =0
- double eta_I =0
- double eta_bg =0
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- IdxT num_phases
- double sigma_scale

8.27.1 Detailed Description

Definition at line 15 of file MCMCAdaptor1D.h.

8.27.2 Member Typedef Documentation

8.27.2.1 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.27.2.2 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.27.3 Constructor & Destructor Documentation

8.27.3.1 mappel::MCMCAdaptor1D::MCMCAdaptor1D ( ) [protected]

Definition at line 11 of file MCMCAdaptor1D.cpp.

8.27.3.2 mappel::MCMCAdaptor1D::MCMCAdaptor1D (double *sigma_scale*) [explicit], [protected]

Definition at line 14 of file MCMCAdaptor1D.cpp.

References eta_x, mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), set_background_mcmc_sampling(), set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::sigma_scale.

8.27.3.3 mappel::MCMCAdaptor1D::MCMCAdaptor1D (const MCMCAdaptor1D & *o*) [protected]

Definition at line 24 of file MCMCAdaptor1D.cpp.

References eta_bg, eta_I, and eta_x.

8.27.3.4 mappel::MCMCAdaptor1D::MCMCAdaptor1D (MCMCAdaptor1D && *o*) [protected]

Definition at line 33 of file MCMCAdaptor1D.cpp.

References eta_bg, eta_I, and eta_x.

8.27.4 Member Function Documentation

8.27.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.27.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.27.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.27.4.4 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.27.4.5 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.27.4.6 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.27.4.7 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.27.4.8 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.9 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.10 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by set_background_mcmc_sampling(), and set_intensity_mcmc_sampling().

8.27.4.11 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.12 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and set_background_mcmc_↩ sampling().

8.27.4.13 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.27.4.14 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.27.4.15 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.27.4.16 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.27.4.17 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.18 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.27.4.19 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.20 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.27.4.21 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.27.4.22 StatsT mappel::MCMCAdaptor1D::get_stats ( ) const [protected]

Definition at line 98 of file MCMCAdaptor1D.cpp.

References eta_bg, eta_I, eta_x, and mappel::MCMCAdaptorBase::get_stats().

Referenced by mappel::MCMCAdaptor1Ds::get_stats(), mappel::MCMCAdaptor2D::get_stats(), and mappel::Gauss1↩ DModel::get_stats().

8.27.4.23 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.27.4.24 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.25 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.27.4.26 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.27.4.27 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.27.4.28 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.27.4.29 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.27.4.30 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.27.4.31 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.27.4.32 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.27.4.33 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.27.4.34 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_↩ default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2Ds↩ Model::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2↩ DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2Ds↩ Model::make_prior_beta_position().

8.27.4.35 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_↩ default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2↩ DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel↩ ::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.27.4.36 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_↩ default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2↩ DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::↩ Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel↩ ::Gauss2DsModel::make_prior_normal_position().

8.27.4.37 MCMCAdaptor1D & mappel::MCMCAdaptor1D::operator= (const MCMCAdaptor1D & *o*) [protected]

Definition at line 42 of file MCMCAdaptor1D.cpp.

References eta_bg, eta_l, and eta_x.

Referenced by mappel::MCMCAdaptor1Ds::operator=(), mappel::MCMCAdaptor2D::operator=(), and mappel::↩ Gauss1DModel::operator=().

8.27.4.38 MCMCAdaptor1D & mappel::MCMCAdaptor1D::operator= (MCMCAdaptor1D && *o*) [protected]

Definition at line 53 of file MCMCAdaptor1D.cpp.

References eta_bg, eta_l, and eta_x.

8.27.4.39 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.27.4.40 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.27.4.41 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.42 void mappel::MCMCAdaptor1D::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0)

Definition at line 108 of file MCMCAdaptor1D.cpp.

References eta_bg, eta_l, eta_x, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.27.4.43 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.44 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.27.4.45 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = −1)

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, eta_bg, mappel::PointEmitterModel::get_hyperparam↩ _value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMC↩ AdaptorBase::sigma_scale.

Referenced by MCMCAdaptor1D().

8.27.4.46 void mappel::PointEmitterModel::set_bounds (const **ParamT** & *lbound_*, const **ParamT** & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.27.4.47 void mappel::PointEmitterModel::set_hyperparam_names (const **StringVecT** & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.48 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.49 void mappel::PointEmitterModel::set_hyperparams (const **VecT** & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.27.4.50 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = −1)

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, eta_I, mappel::PointEmitterModel::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by MCMCAdaptor1D().

8.27.4.51 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.27.4.52 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩ Ds().

8.27.4.53 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩ _scale.

8.27.4.54 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.27.4.55 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.27.4.56 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.27.4.57 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.27.4.58 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.27.4.59 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.27.4.60 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.27.5 Member Data Documentation

8.27.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.27.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.27.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.27.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.27.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.27.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by set_intensity_mcmc_sampling().

8.27.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make↩
_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2↩
DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_↩
normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and set_background_mcmc_↩
sampling().

8.27.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.27.5.9 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.27.5.10 double mappel::MCMCAdaptor1D::eta_bg =0 [protected]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by get_stats(), MCMCAdaptor1D(), operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), sample_mcmc_candidate(), and set_background_mcmc_sampling().

8.27.5.11 double mappel::MCMCAdaptor1D::eta_I =0 [protected]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by get_stats(), MCMCAdaptor1D(), operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), sample_mcmc_candidate(), and set_intensity_mcmc_sampling().

8.27.5.12 double mappel::MCMCAdaptor1D::eta_x =0 [protected]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by get_stats(), MCMCAdaptor1D(), operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and sample_mcmc_candidate().

8.27.5.13 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.27.5.14 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.27.5.15 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static],[inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.27.5.16 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static],[inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.27.5.17 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.27.5.18 IdxT mappel::PointEmitterModel::num_hyperparams [protected],[inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.27.5.19 IdxT mappel::PointEmitterModel::num_params [protected],[inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.27.5.20 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.27.5.21 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.27.5.22 double mappel::MCMCAdaptorBase::sigma_scale [protected], [inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), set_background_mcmc_sampling(), set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.27.5.23 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

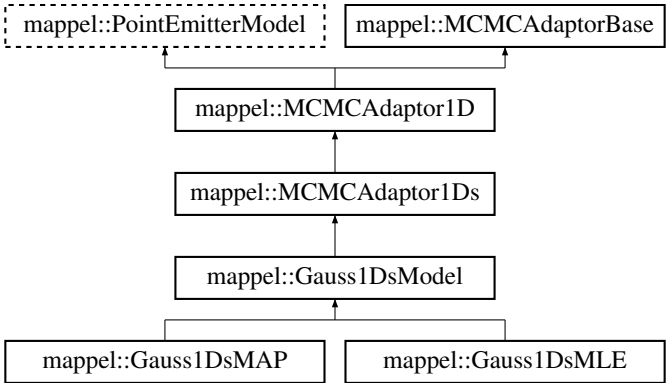
The documentation for this class was generated from the following files:

- MCMCAdaptor1D.h
- MCMCAdaptor1D.cpp

8.28 mappel::MCMCAdaptor1Ds Class Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/MCMCAdaptor1Ds.h>`

Inheritance diagram for mappel::MCMCAdaptor1Ds:



Public Types

- using ParamT = arma::vec
- using ParamVecT = arma::mat

Public Member Functions

- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)

- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()

Static Public Attributes

- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5

Protected Member Functions

- MCMCAdaptor1Ds ()
- MCMCAdaptor1Ds (double sigma_scale)
- MCMCAdaptor1Ds (const MCMCAdaptor1Ds &o)
- MCMCAdaptor1Ds (MCMCAdaptor1Ds &&o)
- MCMCAdaptor1Ds & operator= (const MCMCAdaptor1Ds &o)
- MCMCAdaptor1Ds & operator= (MCMCAdaptor1Ds &&o)
- StatsT get_stats () const
- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- double eta_sigma =-1
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- IdxT num_phases
- double sigma_scale

8.28.1 Detailed Description

Definition at line 14 of file MCMCAdaptor1Ds.h.

8.28.2 Member Typedef Documentation

8.28.2.1 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.28.2.2 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.28.3 Constructor & Destructor Documentation

8.28.3.1 mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds ( ) [protected]

Definition at line 11 of file MCMCAdaptor1Ds.cpp.

References mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale.

8.28.3.2 mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds (double *sigma_scale*) [explicit], [protected]

Definition at line 14 of file MCMCAdaptor1Ds.cpp.

References eta_sigma, mappel::MCMCAdaptorBase::set_mcmc_num_phases(), and mappel::MCMCAdaptorBase::sigma_scale.

8.28.3.3 mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds (const MCMCAdaptor1Ds & *o*) [protected]

Definition at line 21 of file MCMCAdaptor1Ds.cpp.

References eta_sigma.

8.28.3.4 mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds (MCMCAdaptor1Ds && *o*) [protected]

Definition at line 28 of file MCMCAdaptor1Ds.cpp.

References eta_sigma.

8.28.4 Member Function Documentation

8.28.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.28.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.28.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.28.4.4 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.28.4.5 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.28.4.6 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.28.4.7 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.28.4.8 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.9 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.10 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.28.4.11 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.12 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.28.4.13 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.28.4.14 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.28.4.15 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.28.4.16 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.28.4.17 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.18 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.28.4.19 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.20 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.28.4.21 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.28.4.22 StatsT mappel::MCMCAdaptor1Ds::get_stats ( ) const [protected]

Definition at line 51 of file MCMCAdaptor1Ds.cpp.

References eta_sigma, and mappel::MCMCAdaptor1D::get_stats().

Referenced by mappel::Gauss1DsModel::get_stats().

8.28.4.23 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMC↩Adaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.28.4.24 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.25 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::↩Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel↩::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_↩update().

8.28.4.26 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.28.4.27 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.28.4.28 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.28.4.29 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.28.4.30 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.28.4.31 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.28.4.32 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.28.4.33 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.28.4.34 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static],[inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_↩ default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2Ds↩ Model::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2↩ DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2Ds↩ Model::make_prior_beta_position().

8.28.4.35 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static],[inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_↩ default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2↩ DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel↩ ::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.28.4.36 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static],[inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_↩ default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2↩ DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::↩ Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel↩ ::Gauss2DsModel::make_prior_normal_position().

8.28.4.37 MCMCAdaptor1Ds & mappel::MCMCAdaptor1Ds::operator= (const MCMCAdaptor1Ds & *o*) [protected]

Definition at line 35 of file MCMCAdaptor1Ds.cpp.

References eta_sigma, and mappel::MCMCAdaptor1D::operator=().

Referenced by mappel::Gauss1DsModel::operator=().

8.28.4.38 MCMCAdaptor1Ds & mappel::MCMCAdaptor1Ds::operator= (MCMCAdaptor1Ds && *o*) [protected]

Definition at line 43 of file MCMCAdaptor1Ds.cpp.

References eta_sigma, and mappel::MCMCAdaptor1D::operator=().

8.28.4.39 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.28.4.40 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.28.4.41 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.42 void mappel::MCMCAdaptor1Ds::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0)

Definition at line 59 of file MCMCAdaptor1Ds.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_I, eta_sigma, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.28.4.43 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.44 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.28.4.45 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = −1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.28.4.46 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.28.4.47 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.48 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.49 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.28.4.50 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = −1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitterModel::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.28.4.51 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.28.4.52 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.28.4.53 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma_scale.

8.28.4.54 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.28.4.55 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.28.4.56 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.28.4.57 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.28.4.58 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.28.4.59 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.28.4.60 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.28.5 Member Data Documentation

8.28.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.28.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.28.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.28.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.28.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.28.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.28.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.28.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.28.5.9 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.28.5.10 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.28.5.11 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.28.5.12 double mappel::MCMCAdaptor1Ds::eta_sigma =-1 [protected]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor1Ds.h.

Referenced by get_stats(), MCMCAdaptor1Ds(), operator=(), and sample_mcmc_candidate().

8.28.5.13 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.28.5.14 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.28.5.15 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.28.5.16 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static],[inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.28.5.17 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static],[inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.28.5.18 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.28.5.19 IdxT mappel::PointEmitterModel::num_hyperparams [protected],[inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.28.5.20 IdxT mappel::PointEmitterModel::num_params [protected],[inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.28.5.21 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.28.5.22 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.28.5.23 double mappel::MCMCAdaptorBase::sigma_scale [protected], [inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.28.5.24 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

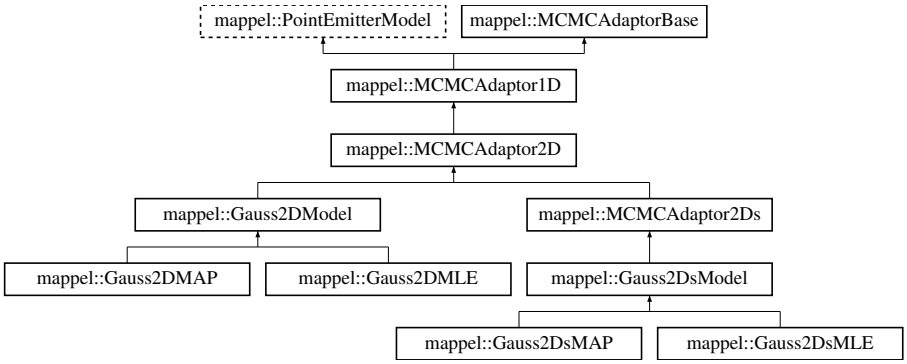
The documentation for this class was generated from the following files:

- MCMCAdaptor1Ds.h
- MCMCAdaptor1Ds.cpp

8.29 mappel::MCMCAdaptor2D Class Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/MCMCAdaptor2D.h>`

Inheritance diagram for mappel::MCMCAdaptor2D:



Public Types

- using ParamT = arma::vec
- using ParamVecT = arma::mat

Public Member Functions

- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)

- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()

Static Public Attributes

- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5

Protected Member Functions

- MCMCAdaptor2D ()
- MCMCAdaptor2D (double sigma_scale)
- MCMCAdaptor2D (const MCMCAdaptor2D &o)
- MCMCAdaptor2D (MCMCAdaptor2D &&o)
- MCMCAdaptor2D & operator= (const MCMCAdaptor2D &o)
- MCMCAdaptor2D & operator= (MCMCAdaptor2D &&o)
- StatsT get_stats () const
- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- double eta_y =0
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- IdxT num_phases
- double sigma_scale

8.29.1 Detailed Description

Definition at line 14 of file MCMCAdaptor2D.h.

8.29.2 Member Typedef Documentation

8.29.2.1 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.29.2.2 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.29.3 Constructor & Destructor Documentation

8.29.3.1 mappel::MCMCAdaptor2D::MCMCAdaptor2D ( ) [protected]

Definition at line 11 of file MCMCAdaptor2D.cpp.

References mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale.

8.29.3.2 mappel::MCMCAdaptor2D::MCMCAdaptor2D (double *sigma_scale*) [explicit], [protected]

Definition at line 14 of file MCMCAdaptor2D.cpp.

References eta_y, mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

8.29.3.3 mappel::MCMCAdaptor2D::MCMCAdaptor2D (const MCMCAdaptor2D & *o*) [protected]

Definition at line 22 of file MCMCAdaptor2D.cpp.

References eta_y.

8.29.3.4 mappel::MCMCAdaptor2D::MCMCAdaptor2D (MCMCAdaptor2D && *o*) [protected]

Definition at line 27 of file MCMCAdaptor2D.cpp.

References eta_y.

8.29.4 Member Function Documentation

8.29.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.29.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.29.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.29.4.4 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.29.4.5 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.29.4.6 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.29.4.7 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.29.4.8 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.9 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.10 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩intensity_mcmc_sampling().

8.29.4.11 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.12 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), MCMCAdaptor2D(), and mappel::MCMCAdaptor1D↩::set_background_mcmc_sampling().

8.29.4.13 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.29.4.14 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.29.4.15 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.29.4.16 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.29.4.17 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.18 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.29.4.19 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.20 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.29.4.21 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.29.4.22 StatsT mappel::MCMCAdaptor2D::get_stats ( ) const [protected]

Definition at line 51 of file MCMCAdaptor2D.cpp.

References eta_y, and mappel::MCMCAdaptor1D::get_stats().

Referenced by mappel::MCMCAdaptor2Ds::get_stats(), and mappel::Gauss2DModel::get_stats().

8.29.4.23 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_↩ mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.29.4.24 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.25 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::↩ Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel↩ ::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_↩ update().

8.29.4.26 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.29.4.27 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.29.4.28 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.29.4.29 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.29.4.30 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.29.4.31 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.29.4.32 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.29.4.33 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.29.4.34 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static],[inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_↩ default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2Ds↩ Model::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2↩ DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2Ds↩ Model::make_prior_beta_position().

8.29.4.35 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static],[inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_↩ default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2↩ DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel↩ ::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.29.4.36 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static],[inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_↩ default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2↩ DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::↩ Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel↩ ::Gauss2DsModel::make_prior_normal_position().

8.29.4.37 MCMCAdaptor2D & mappel::MCMCAdaptor2D::operator= (const MCMCAdaptor2D & *o*) [protected]

Definition at line 32 of file MCMCAdaptor2D.cpp.

References eta_y, and mappel::MCMCAdaptor1D::operator=().

Referenced by mappel::MCMCAdaptor2Ds::operator=(), and mappel::Gauss2DModel::operator=().

8.29.4.38 MCMCAdaptor2D & mappel::MCMCAdaptor2D::operator= (MCMCAdaptor2D && *o*) [protected]

Definition at line 41 of file MCMCAdaptor2D.cpp.

References eta_y, and mappel::MCMCAdaptor1D::operator=().

8.29.4.39 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.29.4.40 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.29.4.41 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.42 void mappel::MCMCAdaptor2D::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0)

Definition at line 59 of file MCMCAdaptor2D.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_I, mappel::MCMCAdaptor1D::eta_x, eta_y, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.29.4.43 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.44 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.29.4.45 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = −1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.29.4.46 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.29.4.47 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.48 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.49 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.29.4.50 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = −1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitterModel::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.29.4.51 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩ Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.29.4.52 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩ Ds().

8.29.4.53 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩ _scale.

8.29.4.54 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.29.4.55 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.29.4.56 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::Point↩ EmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.29.4.57 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.29.4.58 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.29.4.59 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.29.4.60 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.29.5 Member Data Documentation

8.29.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.29.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.29.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.29.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.29.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.29.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.29.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make↩
_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2↩
DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_↩
normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D↩
::set_background_mcmc_sampling().

8.29.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.29.5.9 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.29.5.10 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::↩ MCMCAdaptor1D::operator=(), sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.29.5.11 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::↩ MCMCAdaptor1D::operator=(), sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.29.5.12 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::↩ MCMCAdaptor1D::operator=(), sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.29.5.13 double mappel::MCMCAdaptor2D::eta_y =0 [protected]

The standard deviation for the normally distributed perturbation to theta_y in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor2D.h.

Referenced by get_stats(), MCMCAdaptor2D(), operator=(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), and sample_mcmc_candidate().

8.29.5.14 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), MCMCAdaptor2D(), and mappel::MCMCAdaptor2↩ Ds::MCMCAdaptor2Ds().

8.29.5.15 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.29.5.16 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.29.5.17 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.29.5.18 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel↩ ::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta↩ _estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel↩ ::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::Point↩ EmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.29.5.19 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.29.5.20 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.29.5.21 IdxT mappel::MCMCAdaptorBase::num_phases [protected], [inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.29.5.22 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.29.5.23 double mappel::MCMCAdaptorBase::sigma_scale [protected], [inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.29.5.24 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

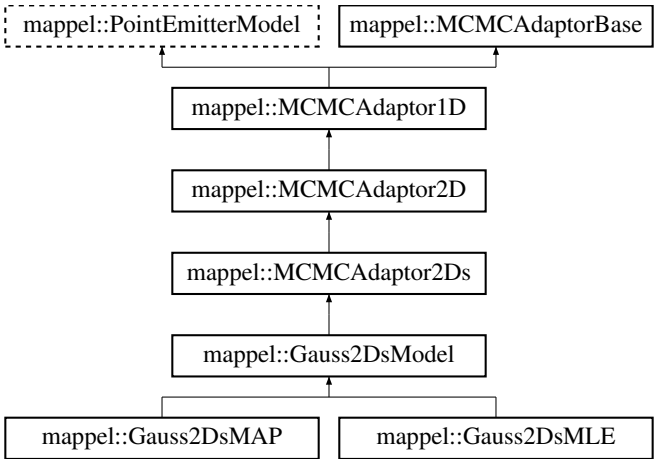
The documentation for this class was generated from the following files:

- MCMCAdaptor2D.h
- MCMCAdaptor2D.cpp

8.30 mappel::MCMCAdaptor2Ds Class Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/MCMCAdaptor2Ds.h>`

Inheritance diagram for mappel::MCMCAdaptor2Ds:



Public Types

- using ParamT = arma::vec
- using ParamVecT = arma::mat

Public Member Functions

- void sample_mcmc_candidate (IdxT sample_index, ParamT &candidate, double step_scale=1.0)
- void set_intensity_mcmc_sampling (double eta_I=-1)
- void set_background_mcmc_sampling (double eta_bg=-1)
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const
- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const

- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const
- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Member Functions

- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()

Static Public Attributes

- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2
- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5

Protected Member Functions

- MCMCAdaptor2Ds ()
- MCMCAdaptor2Ds (double sigma_scale)
- MCMCAdaptor2Ds (const MCMCAdaptor2Ds &o)
- MCMCAdaptor2Ds (MCMCAdaptor2Ds &&o)
- MCMCAdaptor2Ds & operator= (const MCMCAdaptor2Ds &o)
- MCMCAdaptor2Ds & operator= (MCMCAdaptor2Ds &&o)
- StatsT get_stats () const
- void set_mcmc_num_phases (IdxT num_phases)

Protected Attributes

- double eta_sigma =0
- double eta_y =0
- double eta_x =0
- double eta_I =0
- double eta_bg =0
- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound
- IdxT num_phases
- double sigma_scale

8.30.1 Detailed Description

Definition at line 14 of file MCMCAdaptor2Ds.h.

8.30.2 Member Typedef Documentation

8.30.2.1 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.30.2.2 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.30.3 Constructor & Destructor Documentation

8.30.3.1 mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds ( ) [protected]

Definition at line 11 of file MCMCAdaptor2Ds.cpp.

References mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale.

8.30.3.2 mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds (double *sigma_scale*) [explicit], [protected]

Definition at line 14 of file MCMCAdaptor2Ds.cpp.

References eta_sigma, mappel::MCMCAdaptorBase::set_mcmc_num_phases(), and mappel::MCMCAdaptorBase::sigma_scale.

8.30.3.3 mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds (const MCMCAdaptor2Ds & *o*) [protected]

Definition at line 22 of file MCMCAdaptor2Ds.cpp.

References eta_sigma.

8.30.3.4 mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds (MCMCAdaptor2Ds && *o*) [protected]

Definition at line 27 of file MCMCAdaptor2Ds.cpp.

References eta_sigma.

8.30.4 Member Function Documentation

8.30.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.30.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::Point↩EmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.30.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.30.4.4 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel↩::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitter↩Model::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel↩::theta_stack_in_bounds().

8.30.4.5 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.30.4.6 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::↩ Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_↩ max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::↩ Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.30.4.7 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_↩ sigma.

8.30.4.8 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.9 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.10 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.30.4.11 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.12 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.30.4.13 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const [inherited]

Definition at line 56 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

8.30.4.14 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const [inherited]

Definition at line 53 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::sigma_scale.

8.30.4.15 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.30.4.16 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.30.4.17 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.18 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.30.4.19 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.20 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.30.4.21 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.30.4.22 StatsT mappel::MCMCAdaptor2Ds::get_stats ( ) const [protected]

Definition at line 48 of file MCMCAdaptor2Ds.cpp.

References eta_sigma, and mappel::MCMCAdaptor2D::get_stats().

Referenced by mappel::Gauss2DsModel::get_stats().

8.30.4.23 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMC↩ Adaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.30.4.24 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.25 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.30.4.26 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.30.4.27 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.30.4.28 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.30.4.29 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.30.4.30 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.30.4.31 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.30.4.32 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.30.4.33 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.30.4.34 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size*, double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.30.4.35 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size*, double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.30.4.36 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma*, double *max_sigma*, double *alpha* = default_alpha_sigma) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.30.4.37 MCMCAdaptor2Ds & mappel::MCMCAdaptor2Ds::operator= (const MCMCAdaptor2Ds & *o*) [protected]

Definition at line 32 of file MCMCAdaptor2Ds.cpp.

References eta_sigma, and mappel::MCMCAdaptor2D::operator=().

Referenced by mappel::Gauss2DsModel::operator=().

8.30.4.38 MCMCAdaptor2Ds & mappel::MCMCAdaptor2Ds::operator= (MCMCAdaptor2Ds && *o*) [protected]

Definition at line 40 of file MCMCAdaptor2Ds.cpp.

References eta_sigma, and mappel::MCMCAdaptor2D::operator=().

8.30.4.39 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.30.4.40 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.30.4.41 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.42 void mappel::MCMCAdaptor2Ds::sample_mcmc_candidate (IdxT *sample_index,* ParamT & *candidate,* double *step_scale* = 1.0)

Definition at line 56 of file MCMCAdaptor2Ds.cpp.

References mappel::MCMCAdaptor1D::eta_bg, mappel::MCMCAdaptor1D::eta_I, eta_sigma, mappel::MCMCAdaptor1D::eta_x, mappel::MCMCAdaptor2D::eta_y, mappel::MCMCAdaptorBase::num_phases, and mappel::rng_manager.

8.30.4.43 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.44 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.30.4.45 void mappel::MCMCAdaptor1D::set_background_mcmc_sampling (double *eta_bg* = -1) [inherited]

Definition at line 81 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_pixel_mean_bg, mappel::MCMCAdaptor1D::eta_bg, mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_ubound(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.30.4.46 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.30.4.47 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.48 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.49 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.30.4.50 void mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling (double *eta_I* = -1) [inherited]

Definition at line 65 of file MCMCAdaptor1D.cpp.

References mappel::PointEmitterModel::default_mean_I, mappel::MCMCAdaptor1D::eta_I, mappel::PointEmitter↩Model::get_hyperparam_value(), and mappel::MCMCAdaptorBase::sigma_scale.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D().

8.30.4.51 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.30.4.52 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected], [inherited]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and MCMCAdaptor2Ds().

8.30.4.53 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*) [inherited]

Definition at line 39 of file MCMCAdaptorBase.cpp.

References mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale, and mappel::MCMCAdaptorBase::sigma↩_scale.

8.30.4.54 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.30.4.55 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.30.4.56 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.30.4.57 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.30.4.58 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.30.4.59 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.30.4.60 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.30.5 Member Data Documentation

8.30.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2↩ DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.30.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.30.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.30.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.30.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.30.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.30.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.30.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.30.5.9 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.30.5.10 double mappel::MCMCAdaptor1D::eta_bg =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 32 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.30.5.11 double mappel::MCMCAdaptor1D::eta_I =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_I in the random walk MCMC sampling

Definition at line 31 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1D::operator=(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.30.5.12 double mappel::MCMCAdaptor2Ds::eta_sigma =0 [protected]

The standard deviation for the normally distributed perturbation to theta_bg in the random walk MCMC sampling

Definition at line 26 of file MCMCAdaptor2Ds.h.

Referenced by get_stats(), MCMCAdaptor2Ds(), operator=(), and sample_mcmc_candidate().

8.30.5.13 double mappel::MCMCAdaptor1D::eta_x =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_x in the random walk MCMC sampling

Definition at line 30 of file MCMCAdaptor1D.h.

Referenced by mappel::MCMCAdaptor1D::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::M↩ CMCAdaptor1D::operator=(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2D↩ ::sample_mcmc_candidate(), sample_mcmc_candidate(), and mappel::MCMCAdaptor1D::sample_mcmc_candidate().

8.30.5.14 double mappel::MCMCAdaptor2D::eta_y =0 [protected], [inherited]

The standard deviation for the normally distributed perturbation to theta_y in the random walk MCMC sampling

Definition at line 27 of file MCMCAdaptor2D.h.

Referenced by mappel::MCMCAdaptor2D::get_stats(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MC↩ MCAdaptor2D::operator=(), sample_mcmc_candidate(), and mappel::MCMCAdaptor2D::sample_mcmc_candidate().

8.30.5.15 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static], [inherited]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and MCMCAdaptor2Ds().

8.30.5.16 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static], [inherited]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::MCMCAdaptorBase(), and mappel::MCMCAdaptorBase::set_mcmc_↩ sigma_scale().

8.30.5.17 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.30.5.18 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static],[inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.30.5.19 ParamT mappel::PointEmitterModel::lbound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.30.5.20 IdxT mappel::PointEmitterModel::num_hyperparams [protected],[inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.30.5.21 IdxT mappel::PointEmitterModel::num_params [protected],[inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.30.5.22 IdxT mappel::MCMCAdaptorBase::num_phases [protected],[inherited]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_num_phases(), mappel::MCMCAdaptorBase::get_stats(), sample_mcmc_candidate(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and mappel::MCMCAdaptorBase::set_mcmc_num_phases().

8.30.5.23 CompositeDist mappel::PointEmitterModel::prior [protected],[inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.30.5.24 double mappel::MCMCAdaptorBase::sigma_scale [protected],[inherited]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptorBase::get_mcmc_sigma_scale(), mappel::MCMCAdaptorBase::get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and mappel::MCMCAdaptorBase::set_mcmc_sigma_scale().

8.30.5.25 ParamT mappel::PointEmitterModel::ubound [protected],[inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

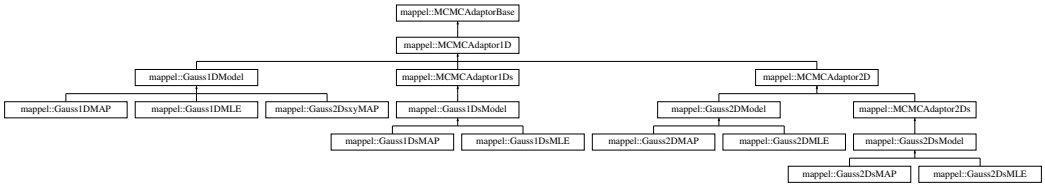
The documentation for this class was generated from the following files:

- MCMCAdaptor2Ds.h
- MCMCAdaptor2Ds.cpp

8.31 mappel::MCMCAdaptorBase Class Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/MCMCAdaptor↩ Base.h>`

Inheritance diagram for mappel::MCMCAdaptorBase:



Public Member Functions

- void set_mcmc_sigma_scale (double scale)
- double get_mcmc_sigma_scale () const
- IdxT get_mcmc_num_phases () const

Static Public Attributes

- static const double global_default_mcmc_sigma_scale = 0.05
- static const double global_max_mcmc_sigma_scale = 0.5

Protected Member Functions

- MCMCAdaptorBase (IdxT num_phases)
- MCMCAdaptorBase (IdxT num_phases, double sigma_scale)
- void set_mcmc_num_phases (IdxT num_phases)
- StatsT get_stats () const

Protected Attributes

- IdxT num_phases
- double sigma_scale

8.31.1 Detailed Description

Definition at line 13 of file MCMCAdaptorBase.h.

8.31.2 Constructor & Destructor Documentation

8.31.2.1 mappel::MCMCAdaptorBase::MCMCAdaptorBase (IdxT *num_phases*) [protected]

Definition at line 14 of file MCMCAdaptorBase.cpp.

8.31.2.2 mappel::MCMCAdaptorBase::MCMCAdaptorBase (IdxT *num_phases,* double *sigma_scale*) [protected]

Definition at line 18 of file MCMCAdaptorBase.cpp.

References global_max_mcmc_sigma_scale.

8.31.3 Member Function Documentation

8.31.3.1 IdxT mappel::MCMCAdaptorBase::get_mcmc_num_phases ( ) const

Definition at line 56 of file MCMCAdaptorBase.cpp.

References num_phases.

8.31.3.2 double mappel::MCMCAdaptorBase::get_mcmc_sigma_scale ( ) const

Definition at line 53 of file MCMCAdaptorBase.cpp.

References sigma_scale.

8.31.3.3 StatsT mappel::MCMCAdaptorBase::get_stats ( ) const [protected]

Definition at line 70 of file MCMCAdaptorBase.cpp.

References num_phases, and sigma_scale.

Referenced by mappel::MCMCAdaptor1D::get_stats().

8.31.3.4 void mappel::MCMCAdaptorBase::set_mcmc_num_phases (IdxT *num_phases*) [protected]

Definition at line 59 of file MCMCAdaptorBase.cpp.

References num_phases.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2↩Ds().

8.31.3.5 void mappel::MCMCAdaptorBase::set_mcmc_sigma_scale (double *scale*)

Definition at line 39 of file MCMCAdaptorBase.cpp.

References global_max_mcmc_sigma_scale, and sigma_scale.

8.31.4 Member Data Documentation

8.31.4.1 const double mappel::MCMCAdaptorBase::global_default_mcmc_sigma_scale = 0.05 [static]

Definition at line 16 of file MCMCAdaptorBase.h.

Referenced by mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds().

8.31.4.2 const double mappel::MCMCAdaptorBase::global_max_mcmc_sigma_scale = 0.5 [static]

Definition at line 17 of file MCMCAdaptorBase.h.

Referenced by MCMCAdaptorBase(), and set_mcmc_sigma_scale().

8.31.4.3 IdxT mappel::MCMCAdaptorBase::num_phases [protected]

The number of different sampling phases for candidate selection MCMC. Each phase changes a different subset of variables.

Definition at line 29 of file MCMCAdaptorBase.h.

Referenced by get_mcmc_num_phases(), get_stats(), mappel::MCMCAdaptor2D::sample_mcmc_candidate(), mappel::MCMCAdaptor1Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor2Ds::sample_mcmc_candidate(), mappel::MCMCAdaptor1D::sample_mcmc_candidate(), and set_mcmc_num_phases().

8.31.4.4 double mappel::MCMCAdaptorBase::sigma_scale [protected]

A scaling factor for step sizes as a fraction of the size of the domain dimension we are walking in. (0.05 default)

Definition at line 30 of file MCMCAdaptorBase.h.

Referenced by get_mcmc_sigma_scale(), get_stats(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor1Ds::MCMCAdaptor1Ds(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor2Ds::MCMCAdaptor2Ds(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling(), and set_mcmc_sigma_scale().

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

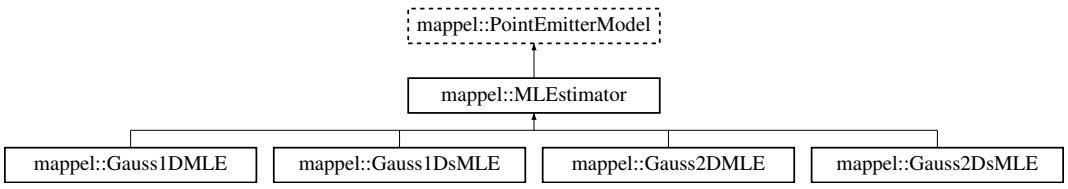
- MCMCAdaptorBase.h
- MCMCAdaptorBase.cpp

8.32 mappel::MLEstimator Class Reference

A Mixin class to configure a for MLE estimation (null prior).

`#include </home/travis/build/markjolah/Mappel/include/Mappel/MLEstimator.h>`

Inheritance diagram for mappel::MLEstimator:



Public Types

- using ParamT = arma::vec
- using ParamVecT = arma::mat

Public Member Functions

- StatsT get_stats () const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- template<class FillT >
  ParamT make_param (FillT fill) const
- ParamVecT make_param_stack (IdxT n) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- MatT make_param_mat () const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const

- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const

Static Public Member Functions

- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()

Static Public Attributes

- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2

Protected Member Functions

- MLEstimator ()=default
- MLEstimator (const MLEstimator &o)
- MLEstimator (MLEstimator &&o)
- MLEstimator & operator= (const MLEstimator &o)
- MLEstimator & operator= (MLEstimator &&o)

Protected Attributes

- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound

8.32.1 Detailed Description

A Mixin class to configure a for MLE estimation (null prior).

Inheriting from this class modifies the objective function undergoing optimization to use a Null prior, by simply ignoring the effect of the prior on the objective. This which effectively turns the objective function into a pure likelihood function, and the estimator becomes an MLE estimator.

Definition at line 22 of file MLEstimator.h.

8.32.2 Member Typedef Documentation

8.32.2.1 using mappel::PointEmitterModel::ParamT = arma::vec [inherited]

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.32.2.2 using mappel::PointEmitterModel::ParamVecT = arma::mat [inherited]

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.32.3 Constructor & Destructor Documentation

8.32.3.1 mappel::MLEstimator::MLEstimator ( ) [protected], [default]

8.32.3.2 mappel::MLEstimator::MLEstimator (const MLEstimator & *o*) [inline], [protected]

Definition at line 25 of file MLEstimator.h.

8.32.3.3 mappel::MLEstimator::MLEstimator (MLEstimator && *o*) [inline], [protected]

Definition at line 26 of file MLEstimator.h.

8.32.4 Member Function Documentation

8.32.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const [inherited]

Definition at line 247 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

8.32.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 264 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::bounded_theta_stack().

8.32.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon =* bounds_epsilon) const [inherited]

Definition at line 306 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::make_param_stack().

8.32.4.4 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const [inherited]

Definition at line 166 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::bounded_theta_stack(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::reflected_theta_stack(), mappel::PointEmitterModel::theta_in_bounds(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.32.4.5 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const [inherited]

Definition at line 175 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::num_params.

8.32.4.6 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const [inherited]

Definition at line 184 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.32.4.7 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const [inherited]

Definition at line 196 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::global_max_psf_sigma, and mappel::PointEmitterModel::global_min_psf_sigma.

8.32.4.8 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline], [inherited]

Definition at line 236 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.9 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline], [inherited]

Definition at line 256 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.10 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline], [inherited]

Definition at line 232 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_↩ intensity_mcmc_sampling().

8.32.4.11 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline], [inherited]

Definition at line 224 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.12 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline], [inherited]

Definition at line 212 of file PointEmitterModel.h.

References mappel::PointEmitterModel::lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.32.4.13 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline], [inherited]

Definition at line 208 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_hyperparams.

8.32.4.14 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline], [inherited]

Definition at line 160 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.32.4.15 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline], [inherited]

Definition at line 248 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.16 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline], [inherited]

Definition at line 200 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

8.32.4.17 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline], [inherited]

Definition at line 204 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.18 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static], [inherited]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.32.4.19 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static], [inherited]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.32.4.20 StatsT mappel::PointEmitterModel::get_stats ( ) const [inherited]

Definition at line 124 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, mappel::rng_manager, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DModel::get_stats(), mappel::Gauss1DsModel::get_stats(), mappel::Gauss2DModel::get_stats(), and mappel::Gauss2DsModel::get_stats().

8.32.4.21 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline], [inherited]

Definition at line 216 of file PointEmitterModel.h.

References mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.32.4.22 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline], [inherited]

Definition at line 228 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.23 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline], [inherited]

Definition at line 164 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.32.4.24 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const [inherited]

Definition at line 181 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.32.4.25 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline], [inherited]

Definition at line 172 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.32.4.26 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const [inherited]

Definition at line 191 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.32.4.27 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline], [inherited]

Definition at line 176 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.32.4.28 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const [inherited]

Definition at line 196 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.32.4.29 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline], [inherited]

Definition at line 168 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

Referenced by mappel::PointEmitterModel::bounded_theta_stack(), and mappel::PointEmitterModel::reflected_theta_stack().

8.32.4.30 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*, FillT *fill*) const [inherited]

Definition at line 186 of file PointEmitterModel.h.

References mappel::PointEmitterModel::num_params.

8.32.4.31 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static], [inherited]

Definition at line 97 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.32.4.32 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size*, double *pos_beta* = default_beta_pos) [static], [inherited]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.32.4.33 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size*, double *pos_sigma* = default_sigma_pos) [static], [inherited]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.32.4.34 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = **default_alpha_sigma**) [static], [inherited]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.32.4.35 MLEstimator& mappel::MLEstimator::operator= (const MLEstimator & *o*) [inline], [protected]

Definition at line 27 of file MLEstimator.h.

Referenced by mappel::Gauss1DMLE::operator=(), mappel::Gauss1DsMLE::operator=(), mappel::Gauss2DsMLE::operator=(), and mappel::Gauss2DMLE::operator=().

8.32.4.36 MLEstimator& mappel::MLEstimator::operator= (MLEstimator && *o*) [inline], [protected]

Definition at line 28 of file MLEstimator.h.

8.32.4.37 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const [inherited]

Definition at line 275 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::PointEmitterModel::reflected_theta_stack().

8.32.4.38 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const [inherited]

Definition at line 316 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::make_param_stack(), and mappel::PointEmitterModel::reflected_theta().

8.32.4.39 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline], [inherited]

Definition at line 244 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.40 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*) [inherited]

Definition at line 264 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.41 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline], [inherited]

Definition at line 268 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior, and mappel::rng_manager.

8.32.4.42 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_*, const ParamT & *ubound_*) [inherited]

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitter↩Model::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.32.4.43 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 260 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.44 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name*, double *value*) [inline], [inherited]

Definition at line 240 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.45 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline], [inherited]

Definition at line 220 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.32.4.46 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*) [inherited]

Definition at line 225 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.32.4.47 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline], [inherited]

Definition at line 252 of file PointEmitterModel.h.

References mappel::PointEmitterModel::prior.

8.32.4.48 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*) [inherited]

Definition at line 157 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.32.4.49 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*) [inherited]

Definition at line 148 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_hyperparams, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

8.32.4.50 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static], [inherited]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.32.4.51 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*) [inherited]

Definition at line 236 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::bounds_epsilon, mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, mappel::PointEmitterModel::prior, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.32.4.52 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const [inherited]

Definition at line 256 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::lbound, mappel::PointEmitterModel::num_params, and mappel::PointEmitterModel::ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and mappel::PointEmitterModel::theta_stack_in_bounds().

8.32.4.53 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const [inherited]

Definition at line 296 of file PointEmitterModel.cpp.

References mappel::PointEmitterModel::check_param_shape(), and mappel::PointEmitterModel::theta_in_bounds().

8.32.5 Member Data Documentation

8.32.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static], [inherited]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and mappel::PointEmitterModel::set_ubound().

8.32.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static], [inherited]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.32.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.32.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static], [inherited]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.32.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static], [inherited]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::make_prior_component_intensity().

8.32.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static], [inherited]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.32.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static], [inherited]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.32.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static], [inherited]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.32.5.9 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static], [inherited]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.32.5.10 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static], [inherited]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.32.5.11 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static], [inherited]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::check_psf_sigma().

8.32.5.12 ParamT mappel::PointEmitterModel::lbound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_lbound(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.32.5.13 IdxT mappel::PointEmitterModel::num_hyperparams [protected], [inherited]

Definition at line 147 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::get_num_hyperparams(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::operator=(), and mappel::PointEmitterModel::set_prior().

8.32.5.14 IdxT mappel::PointEmitterModel::num_params [protected], [inherited]

Definition at line 146 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::check_param_shape(), mappel::PointEmitterModel::get_num_params(), mappel::PointEmitterModel::get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::make_param(), mappel::PointEmitterModel::make_param_mat(), mappel::PointEmitterModel::make_param_mat_stack(), mappel::PointEmitterModel::make_param_stack(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

8.32.5.15 CompositeDist mappel::PointEmitterModel::prior [protected], [inherited]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::PointEmitterModel::get_hyperparam_index(), mappel::PointEmitterModel::get_hyperparam_names(), mappel::PointEmitterModel::get_hyperparam_value(), mappel::PointEmitterModel::get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), mappel::PointEmitterModel::get_param_names(), mappel::PointEmitterModel::get_prior(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::has_hyperparam(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::PointEmitterModel(), mappel::PointEmitterModel::rename_hyperparam(), mappel::PointEmitterModel::sample_prior(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_hyperparam_names(), mappel::PointEmitterModel::set_hyperparam_value(), mappel::PointEmitterModel::set_hyperparams(), mappel::PointEmitterModel::set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::PointEmitterModel::set_param_names(), mappel::PointEmitterModel::set_prior(), and mappel::PointEmitterModel::set_ubound().

8.32.5.16 ParamT mappel::PointEmitterModel::ubound [protected], [inherited]

Definition at line 148 of file PointEmitterModel.h.

Referenced by mappel::PointEmitterModel::bound_theta(), mappel::PointEmitterModel::bounded_theta(), mappel::PointEmitterModel::get_stats(), mappel::PointEmitterModel::get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::PointEmitterModel::operator=(), mappel::PointEmitterModel::reflected_theta(), mappel::PointEmitterModel::set_bounds(), mappel::PointEmitterModel::set_lbound(), mappel::PointEmitterModel::set_prior(), mappel::PointEmitterModel::set_ubound(), and mappel::PointEmitterModel::theta_in_bounds().

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

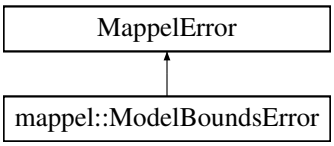
- MLEstimator.h

8.33 mappel::ModelBoundsError Struct Reference

Access outside the model bounds is attempted.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/util.h>`

Inheritance diagram for mappel::ModelBoundsError:



Public Member Functions

- ModelBoundsError (std::string message)

8.33.1 Detailed Description

Access outside the model bounds is attempted.

Definition at line 86 of file util.h.

8.33.2 Constructor & Destructor Documentation

8.33.2.1 mappel::ModelBoundsError::ModelBoundsError (std::string *message*) [inline]

Definition at line 88 of file util.h.

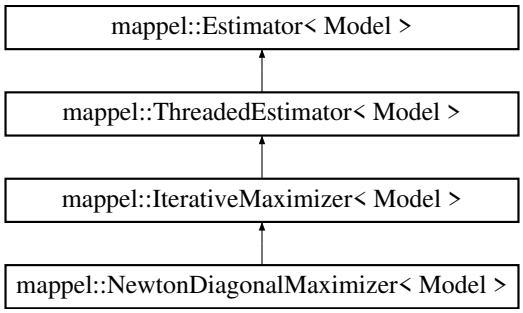
The documentation for this struct was generated from the following file:

- util.h

8.34 mappel::NewtonDiagonalMaximizer< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::NewtonDiagonalMaximizer< Model >:



Public Types

- using MaximizerData = typename IterativeMaximizer< Model >::MaximizerData
- enum ExitCode : IdxT {
  ExitCode::Unassigned = 99, ExitCode::MaxIter = 6, ExitCode::MaxBacktracks = 5, ExitCode::TrustRegionRadius = 4,
  ExitCode::GradRatio = 3, ExitCode::FunctionChange = 2, ExitCode::StepSize = 1, ExitCode::Error = 0 }

Public Member Functions

- NewtonDiagonalMaximizer (Model &model, int max_iterations=DEFAULT_ITERATIONS)
- std::string name () const
- double mean_iterations ()
- double mean_backtracks ()
- double mean_fun_evals ()
- double mean_der_evals ()
- StatsT get_stats ()
- StatsT get_debug_stats ()
- void clear_stats ()
- void local_maximize (const ModelDataT< Model > &im, const StencilT< Model > &theta_init, StencilT< Model > &stencil, double &rllh)

  Perform a local maximization to finish off a simulated annealing run.
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩ stack, VecT &rllh_stack, CubeT &obsI_stack)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_↩ parameters)
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)

- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)

Static Public Attributes

- static constexpr int NumExitCodes = 7

Protected Member Functions

- void maximize (MaximizerData &data)
- void record_run_statistics (const MaximizerData &data)
- StencilT< Model > compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- virtual void maximize (MaximizerData &data)=0
- bool backtrack (MaximizerData &data)
- bool convergence_test (MaximizerData &data)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- int max_iterations
- double epsilon = sqrt(std::numeric_limits<double>::epsilon())
- double delta = sqrt(std::numeric_limits<double>::epsilon())
- double lambda_min = 0.05
- double alpha = 1e-4
- int max_backtracks = 8
- int total_iterations = 0
- int total_backtracks = 0
- int total_fun_evals = 0
- int total_der_evals = 0
- IdxVecT exit_counts
- IdxVecT last_backtrack_idxs
- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.34.1 Detailed Description

template<class Model>
class mappel::NewtonDiagonalMaximizer< Model >

Definition at line 322 of file estimator.h.

8.34.2 Member Typedef Documentation

8.34.2.1 template<class Model> using mappel::NewtonDiagonalMaximizer< Model >::MaximizerData = typename IterativeMaximizer<Model>::MaximizerData

Definition at line 324 of file estimator.h.

8.34.3 Member Enumeration Documentation

8.34.3.1 template<class Model > enum mappel::IterativeMaximizer::ExitCode : IdxT [strong], [inherited]

Enumerator

Unassigned

MaxIter

MaxBacktracks

TrustRegionRadius

GradRatio

FunctionChange

StepSize

Error

Definition at line 198 of file estimator.h.

8.34.4 Constructor & Destructor Documentation

8.34.4.1 template<class Model> mappel::NewtonDiagonalMaximizer< Model >::NewtonDiagonalMaximizer (Model & *model*, int *max_iterations* = DEFAULT_ITERATIONS) [inline]

Definition at line 326 of file estimator.h.

8.34.5 Member Function Documentation

8.34.5.1 template<class Model > bool mappel::IterativeMaximizer< Model >::backtrack (MaximizerData & *data*) [protected], [inherited]

Definition at line 530 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::alpha, mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::im, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration(), mappel::IterativeMaximizer< Model >::MaximizerData::restore_stencil(), mappel::methods::objective::rllh(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::save_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::MaximizerData::set_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::step.

Referenced by mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.34.5.2 template<class Model > void mappel::IterativeMaximizer< Model >::clear_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 504 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::exit_counts, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::IterativeMaximizer< Model >::total_iterations.

8.34.5.3 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamT< Model > & *theta_est*, double & *rllh*, MatT & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.34.5.4 template<class Model > StencilT< Model > mappel::IterativeMaximizer< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [protected], [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 628 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::print_image(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.34.5.5 template<class Model > StencilT< Model > mappel::IterativeMaximizer< Model >::compute_estimate_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamVecT< Model > & *sequence,* VecT & *sequence_rllh*) [protected], [virtual], [inherited]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented from mappel::Estimator< Model >.

Definition at line 653 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence_rllh(), mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

8.34.5.6 template<class Model > void mappel::IterativeMaximizer< Model >::compute_profile_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* const IdxVecT & *fixed_parameters,* ParamT< Model > & *theta_est,* double & *rllh*) [protected], [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Definition at line 672 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::set_fixed_parameters(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.34.5.7 template<class Model > bool mappel::IterativeMaximizer< Model >::convergence_test (MaximizerData & *data*) [protected], [inherited]

Definition at line 606 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::StepSize, and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.34.5.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.34.5.9 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.34.5.10 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.34.5.11 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.34.5.12 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.34.5.13 template<class Model > void **mappel::Estimator**< Model >::estimate_max (const **ModelDataT**< Model > & *im*, const **ParamT**< Model > & *theta_init*, **ParamT**< Model > & *theta*, double & *rllh*, **MatT** & *obsl*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.34.5.14 template<class Model > void **mappel::Estimator**< Model >::estimate_max_debug (const **ModelDataT**< Model > & *im*, const **ParamT**< Model > & *theta_init*, **ParamT**< Model > & *theta_est*, double & *rllh*, **MatT** & *obsl*, **MatT** & *sequence*, **VecT** & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.34.5.15 template<class Model > void **mappel::Estimator**< Model >::estimate_max_stack (const **ModelDataStackT**< Model > & *im_stack*, **ParamVecT**< Model > & *theta_est_stack*, **VecT** & *rllh_stack*, **CubeT** & *obsl_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.34.5.16 template<class Model > void **mappel::ThreadedEstimator**< Model >::estimate_max_stack (const **ModelDataStackT**< Model > & *im*, const **ParamVecT**< Model > & *theta_init*, **ParamVecT**< Model > & *theta*, **VecT** & *rllh*, **CubeT** & *obsl*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.34.5.17 template<class Model > void **mappel::ThreadedEstimator**< Model >::estimate_profile_stack (const **ModelDataT**< Model > & *data*, const **IdxVecT** & *fixed_parameters*, const **MatT** & *values*, const **ParamVecT**< Model > & *theta_init*, **VecT** & *profile_likelihood*, **ParamVecT**< Model > & *profile_parameters*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.34.5.18 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_debug_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 488 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::backtrack_idxs, mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::last_backtrack_idxs.

8.34.5.19 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.34.5.20 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 459 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::ThreadedEstimator< Model >::get_stats(), mappel::IterativeMaximizer< Model >::GradRatio, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::IterativeMaximizer< Model >::MaxIter, mappel::ThreadedEstimator< Model >::mtx, mappel::Estimator< Model >::num_estimations, mappel::IterativeMaximizer< Model >::StepSize, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, mappel::IterativeMaximizer< Model >::total_iterations, and mappel::IterativeMaximizer< Model >::TrustRegionRadius.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats().

8.34.5.21 template<class Model > void mappel::IterativeMaximizer< Model >::local_maximize (const ModelDataT< Model > & *im,* const StencilT< Model > & *theta_init,* StencilT< Model > & *stencil,* double & *rllh*) [inherited]

Perform a local maximization to finish off a simulated annealing run.

Definition at line 690 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::rllh, and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal().

8.34.5.22 template<class Model > virtual void mappel::IterativeMaximizer< Model >::maximize (MaximizerData & *data*) [protected], [pure virtual], [inherited]

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), and mappel::IterativeMaximizer< Model >::local_maximize().

8.34.5.23 template<class Model > void mappel::NewtonDiagonalMaximizer< Model >::maximize (MaximizerData & *data*) [protected]

Definition at line 699 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::methods::objective::grad2(), mappel::IterativeMaximizer< Model >::max_iterations, and mappel::Estimator< Model >::model.

8.34.5.24 template<class Model > double mappel::IterativeMaximizer< Model >::mean_backtracks ( ) [inherited]

8.34.5.25 template<class Model > double mappel::IterativeMaximizer< Model >::mean_der_evals ( ) [inherited]

8.34.5.26 template<class Model > double mappel::IterativeMaximizer< Model >::mean_fun_evals ( ) [inherited]

8.34.5.27 template<class Model > double mappel::IterativeMaximizer< Model >::mean_iterations ( ) [inherited]

8.34.5.28 template<class Model> std::string mappel::NewtonDiagonalMaximizer< Model >::name ( ) const [inline], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 329 of file estimator.h.

8.34.5.29 template<class Model > void mappel::IterativeMaximizer< Model >::record_run_statistics (const MaximizerData & *data*) [protected], [inherited]

Definition at line 517 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::exit_code, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::MaximizerData::get_backtrack_idxs(), mappel::IterativeMaximizer< Model >::last_backtrack_idxs, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::MaximizerData::nBacktracks, mappel::IterativeMaximizer< Model >::MaximizerData::nIterations, mappel::IterativeMaximizer< Model >::MaximizerData::save_seq, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::IterativeMaximizer< Model >::total_iterations.

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::compute_profile_estimate().

8.34.5.30 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.34.5.31 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.34.6 Member Data Documentation

8.34.6.1 template<class Model > double mappel::IterativeMaximizer< Model >::alpha = 1e-4 [protected], [inherited]

Definition at line 232 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), and mappel::TrustRegionMaximizer< Model >::bound_step().

8.34.6.2 template<class Model > double mappel::IterativeMaximizer< Model >::delta = sqrt(std::numeric_limits<double>::epsilon()) [protected], [inherited]

Definition at line 229 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.34.6.3 template<class Model > double mappel::IterativeMaximizer< Model >::epsilon = sqrt(std::numeric_limits<double>::epsilon()) [protected], [inherited]

Definition at line 228 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton().

8.34.6.4 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::exit_counts [protected], [inherited]

Definition at line 240 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.34.6.5 template<class Model > double mappel::IterativeMaximizer< Model >::lambda_min = 0.05 [protected], [inherited]

Definition at line 231 of file estimator.h.

Referenced by mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.34.6.6 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::last_backtrack_idxs [protected], [inherited]

Definition at line 242 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.34.6.7 template<class Model > int mappel::IterativeMaximizer< Model >::max_backtracks = 8 [protected], [inherited]

Definition at line 233 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::get_stats().

8.34.6.8 template<class Model > int mappel::IterativeMaximizer< Model >::max_iterations [protected], [inherited]

Definition at line 225 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.34.6.9 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected], [inherited]

Definition at line 127 of file estimator.h.

8.34.6.10 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.34.6.11 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected], [inherited]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.34.6.12 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.34.6.13 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected], [inherited]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.34.6.14 template<class Model > constexpr int mappel::IterativeMaximizer< Model >::NumExitCodes = 7 [static], [inherited]

Definition at line 197 of file estimator.h.

8.34.6.15 template<class Model > int mappel::IterativeMaximizer< Model >::total_backtracks = 0 [protected], [inherited]

Definition at line 237 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.34.6.16 template<class Model > int mappel::IterativeMaximizer< Model >::total_der_evals = 0 [protected], [inherited]

Definition at line 239 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.34.6.17 template<class Model > int mappel::IterativeMaximizer< Model >::total_fun_evals = 0 [protected], [inherited]

Definition at line 238 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.34.6.18 template<class Model > int mappel::IterativeMaximizer< Model >::total_iterations = 0 [protected], [inherited]

Definition at line 236 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.34.6.19 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

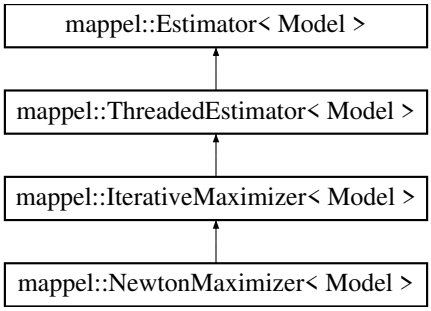
The documentation for this class was generated from the following files:

- estimator.h
- estimator_impl.h

8.35 mappel::NewtonMaximizer< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::NewtonMaximizer< Model >:



Public Types

- using MaximizerData = typename IterativeMaximizer< Model >::MaximizerData
- enum ExitCode : IdxT {
  ExitCode::Unassigned = 99, ExitCode::MaxIter = 6, ExitCode::MaxBacktracks = 5, ExitCode::TrustRegionRadius = 4,
  ExitCode::GradRatio = 3, ExitCode::FunctionChange = 2, ExitCode::StepSize = 1, ExitCode::Error = 0 }

Public Member Functions

- NewtonMaximizer (Model &model, int max_iterations=DEFAULT_ITERATIONS)
- std::string name () const
- double mean_iterations ()
- double mean_backtracks ()
- double mean_fun_evals ()
- double mean_der_evals ()
- StatsT get_stats ()
- StatsT get_debug_stats ()
- void clear_stats ()
- void local_maximize (const ModelDataT< Model > &im, const StencilT< Model > &theta_init, StencilT< Model > &stencil, double &rllh)

  Perform a local maximization to finish off a simulated annealing run.
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩ stack, VecT &rllh_stack, CubeT &obsI_stack)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_↩ parameters)
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)

Static Public Attributes

- static constexpr int NumExitCodes = 7

Protected Member Functions

- void maximize (MaximizerData &data)
- void record_run_statistics (const MaximizerData &data)
- StencilT< Model > compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- virtual void maximize (MaximizerData &data)=0
- bool backtrack (MaximizerData &data)
- bool convergence_test (MaximizerData &data)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- int max_iterations
- double epsilon = sqrt(std::numeric_limits<double>::epsilon())
- double delta = sqrt(std::numeric_limits<double>::epsilon())
- double lambda_min = 0.05
- double alpha = 1e-4
- int max_backtracks = 8
- int total_iterations = 0
- int total_backtracks = 0
- int total_fun_evals = 0
- int total_der_evals = 0
- IdxVecT exit_counts
- IdxVecT last_backtrack_idxs
- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.35.1 Detailed Description

template<class Model>
class mappel::NewtonMaximizer< Model >

Definition at line 336 of file estimator.h.

8.35.2 Member Typedef Documentation

8.35.2.1 template<class Model > using mappel::NewtonMaximizer< Model >::MaximizerData = typename IterativeMaximizer<Model>::MaximizerData

Definition at line 338 of file estimator.h.

8.35.3 Member Enumeration Documentation

8.35.3.1 template<class Model > enum mappel::IterativeMaximizer::ExitCode : IdxT [strong],[inherited]

Enumerator

Unassigned
MaxIter
MaxBacktracks
TrustRegionRadius
GradRatio
FunctionChange
StepSize
Error

Definition at line 198 of file estimator.h.

8.35.4 Constructor & Destructor Documentation

8.35.4.1 template<class Model > mappel::NewtonMaximizer< Model >::NewtonMaximizer (Model & *model,* int *max_iterations* = DEFAULT_ITERATIONS) [inline]

Definition at line 340 of file estimator.h.

8.35.5 Member Function Documentation

8.35.5.1 template<class Model > bool mappel::IterativeMaximizer< Model >::backtrack (MaximizerData & *data*) [protected],[inherited]

Definition at line 530 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::alpha, mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::im, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration(), mappel::IterativeMaximizer< Model >::MaximizerData::restore_stencil(), mappel::methods::objective::rllh(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::save_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::MaximizerData::set_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::step.

Referenced by mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.35.5.2 template<class Model > void mappel::IterativeMaximizer< Model >::clear_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 504 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::exit_counts, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::IterativeMaximizer< Model >::total_iterations.

8.35.5.3 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.35.5.4 template<class Model > StencilT< Model > mappel::IterativeMaximizer< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [protected], [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 628 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::print_image(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.35.5.5 template<class Model > StencilT< Model > mappel::IterativeMaximizer< Model >::compute_estimate_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamVecT< Model > & *sequence,* VecT & *sequence_rllh*) [protected], [virtual], [inherited]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented from mappel::Estimator< Model >.

Definition at line 653 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence_rllh(), mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

8.35.5.6 template<class Model > void mappel::IterativeMaximizer< Model >::compute_profile_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* const IdxVecT & *fixed_parameters,* ParamT< Model > & *theta_est,* double & *rllh*) [protected],[virtual],[inherited]

Reimplemented from mappel::Estimator< Model >.

Definition at line 672 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::set_fixed_parameters(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.35.5.7 template<class Model > bool mappel::IterativeMaximizer< Model >::convergence_test (MaximizerData & *data*) [protected],[inherited]

Definition at line 606 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::StepSize, and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.35.5.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.35.5.9 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.35.5.10 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.35.5.11 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.35.5.12 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsl*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.35.5.13 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsl*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.35.5.14 template<class Model > void mappel::Estimator< Model >::estimate_max_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsl,* MatT & *sequence,* VecT & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.35.5.15 template<class Model > void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack,* ParamVecT< Model > & *theta_est_stack,* VecT & *rllh_stack,* CubeT & *obsl_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.35.5.16 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im,* const ParamVecT< Model > & *theta_init,* ParamVecT< Model > & *theta,* VecT & *rllh,* CubeT & *obsl*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.35.5.17 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_profile_stack (const ModelDataT< Model > & *data,* const IdxVecT & *fixed_parameters,* const MatT & *values,* const ParamVecT< Model > & *theta_init,* VecT & *profile_likelihood,* ParamVecT< Model > & *profile_parameters*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.35.5.18 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_debug_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 488 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::backtrack_idxs, mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::last_backtrack_idxs.

8.35.5.19 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.35.5.20 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 459 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::ThreadedEstimator< Model >::get_stats(), mappel::IterativeMaximizer< Model >::GradRatio, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::IterativeMaximizer< Model >::MaxIter, mappel::ThreadedEstimator< Model >::mtx, mappel::Estimator< Model >::num_estimations, mappel::IterativeMaximizer< Model >::StepSize, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, mappel::IterativeMaximizer< Model >::total_iterations, and mappel::IterativeMaximizer< Model >::TrustRegionRadius.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats().

8.35.5.21 template<class Model > void mappel::IterativeMaximizer< Model >::local_maximize (const ModelDataT< Model > & *im,* const StencilT< Model > & *theta_init,* StencilT< Model > & *stencil,* double & *rllh*) [inherited]

Perform a local maximization to finish off a simulated annealing run.

Definition at line 690 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::rllh, and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal().

8.35.5.22 template<class Model > virtual void mappel::IterativeMaximizer< Model >::maximize (MaximizerData & *data*) [protected], [pure virtual], [inherited]

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), and mappel::IterativeMaximizer< Model >::local_maximize().

8.35.5.23 template<class Model > void mappel::NewtonMaximizer< Model >::maximize (MaximizerData & *data*) [protected]

Definition at line 736 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::convergence_test(), mappel::methods::objective::hessian(), mappel::IterativeMaximizer< Model >::max_iterations, and mappel::Estimator< Model >::model.

8.35.5.24 template<class Model > double mappel::IterativeMaximizer< Model >::mean_backtracks ( ) [inherited]

8.35.5.25 template<class Model > double mappel::IterativeMaximizer< Model >::mean_der_evals ( ) [inherited]

8.35.5.26 template<class Model > double mappel::IterativeMaximizer< Model >::mean_fun_evals ( ) [inherited]

8.35.5.27 template<class Model > double mappel::IterativeMaximizer< Model >::mean_iterations ( ) [inherited]

8.35.5.28 template<class Model > std::string mappel::NewtonMaximizer< Model >::name ( ) const [inline], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 343 of file estimator.h.

8.35.5.29 template<class Model > void mappel::IterativeMaximizer< Model >::record_run_statistics (const MaximizerData & *data*) [protected], [inherited]

Definition at line 517 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::exit_code, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::MaximizerData::get_backtrack_idxs(), mappel::IterativeMaximizer< Model >::last_backtrack_idxs, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::MaximizerData::nBacktracks, mappel::IterativeMaximizer< Model >::MaximizerData::nIterations, mappel::IterativeMaximizer< Model >::MaximizerData::save_seq, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::IterativeMaximizer< Model >::total_iterations.

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::compute_profile_estimate().

8.35.5.30 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.35.5.31 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.35.6 Member Data Documentation

8.35.6.1 template<class Model > double mappel::IterativeMaximizer< Model >::alpha = 1e-4 [protected], [inherited]

Definition at line 232 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), and mappel::TrustRegionMaximizer< Model >::bound_step().

8.35.6.2 template<class Model > double mappel::IterativeMaximizer< Model >::delta = sqrt(std::numeric_limits<double>::epsilon()) [protected], [inherited]

Definition at line 229 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.35.6.3 template<class Model > double mappel::IterativeMaximizer< Model >::epsilon = sqrt(std::numeric_limits<double>::epsilon()) [protected], [inherited]

Definition at line 228 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton().

8.35.6.4 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::exit_counts [protected], [inherited]

Definition at line 240 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.35.6.5 template<class Model > double mappel::IterativeMaximizer< Model >::lambda_min = 0.05 [protected], [inherited]

Definition at line 231 of file estimator.h.

Referenced by mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.35.6.6 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::last_backtrack_idxs [protected], [inherited]

Definition at line 242 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.35.6.7 template<class Model > int mappel::IterativeMaximizer< Model >::max_backtracks = 8 [protected], [inherited]

Definition at line 233 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::get_stats().

8.35.6.8 template<class Model > int mappel::IterativeMaximizer< Model >::max_iterations [protected], [inherited]

Definition at line 225 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.35.6.9 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected], [inherited]

Definition at line 127 of file estimator.h.

8.35.6.10 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.35.6.11 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected], [inherited]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.35.6.12 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.35.6.13 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected], [inherited]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.35.6.14 template<class Model > constexpr int mappel::IterativeMaximizer< Model >::NumExitCodes = 7 [static], [inherited]

Definition at line 197 of file estimator.h.

8.35.6.15 template<class Model > int mappel::IterativeMaximizer< Model >::total_backtracks = 0 [protected], [inherited]

Definition at line 237 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.35.6.16 template<class Model > int mappel::IterativeMaximizer< Model >::total_der_evals = 0 [protected], [inherited]

Definition at line 239 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.35.6.17 template<class Model > int mappel::IterativeMaximizer< Model >::total_fun_evals = 0 [protected], [inherited]

Definition at line 238 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.35.6.18 template<class Model > int mappel::IterativeMaximizer< Model >::total_iterations = 0 [protected], [inherited]

Definition at line 236 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.35.6.19 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

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

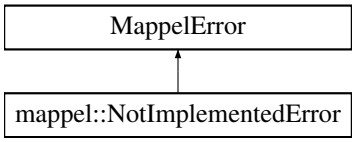
- estimator.h
- estimator_impl.h

8.36 mappel::NotImplementedError Struct Reference

Feature not yet implemented.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/util.h>`

Inheritance diagram for mappel::NotImplementedError:



Public Member Functions

- NotImplementedError (std::string message)

8.36.1 Detailed Description

Feature not yet implemented.

Definition at line 107 of file util.h.

8.36.2 Constructor & Destructor Documentation

8.36.2.1 mappel::NotImplementedError::NotImplementedError (std::string *message*) [inline]

Definition at line 109 of file util.h.

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

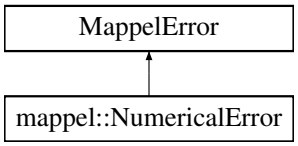
- util.h

8.37 mappel::NumericalError Struct Reference

Expected numerical condition does not hold.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/util.h>`

Inheritance diagram for mappel::NumericalError:



Public Member Functions

- NumericalError (std::string message)

8.37.1 Detailed Description

Expected numerical condition does not hold.

Definition at line 93 of file util.h.

8.37.2 Constructor & Destructor Documentation

8.37.2.1 mappel::NumericalError::NumericalError (std::string *message*) [inline]

Definition at line 95 of file util.h.

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

- util.h

8.38 omp_exception_catcher::impl_::OMPExceptionCatcher< IntType > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/OMPException↩Catcher/OMPExceptionCatcher.h>`

Public Types

- enum Strategy : IntType { Strategy::DoNotTry, Strategy::Continue, Strategy::Abort, Strategy::RethrowFirst }

Public Member Functions

- OMPExceptionCatcher ()
- OMPExceptionCatcher (Strategy strategy_)
- void rethrow () const
- template<class Function , class... Parameters>
  void run (Function func, Parameters...params)

Static Public Member Functions

- static void setGlobalDefaultStrategy (Strategy s)

8.38.1 Detailed Description

template<class IntType = uint32_t>
class omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >

Definition at line 42 of file OMPExceptionCatcher.h.

8.38.2 Member Enumeration Documentation

8.38.2.1 template<class IntType = uint32_t> enum omp_exception_catcher::impl_::OMPExceptionCatcher::Strategy : IntType [strong]

Enumerator

DoNotTry

Continue

Abort

RethrowFirst

Definition at line 45 of file OMPExceptionCatcher.h.

8.38.3 Constructor & Destructor Documentation

8.38.3.1 template<class IntType = uint32_t> omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::OMPExceptionCatcher ( ) [inline]

Definition at line 50 of file OMPExceptionCatcher.h.

8.38.3.2 template<class IntType = uint32_t> omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::OMPExceptionCatcher (Strategy *strategy_*) [inline]

Definition at line 52 of file OMPExceptionCatcher.h.

8.38.4 Member Function Documentation

8.38.4.1 template<class IntType = uint32_t> void omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow ( ) const [inline]

Definition at line 54 of file OMPExceptionCatcher.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::RethrowFirst.

Referenced by mappel::methods::openmp::cr_lower_bound_stack(), mappel::methods::openmp::error_bounds_posterior_credible_stack(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::methods::openmp::estimate_mcmc_posterior_stack(), mappel::methods::openmp::estimate_mcmc_sample_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::methods::openmp::expected_information_stack(), mappel::methods::objective::openmp::grad_stack(), mappel::methods::objective::openmp::hessian_stack(), mappel::methods::objective::openmp::llh_stack(), mappel::methods::openmp::model_image_stack(), mappel::methods::objective::openmp::negative_definite_hessian_stack(), mappel::methods::objective::openmp::rllh_stack(), mappel::methods::openmp::sample_prior_stack(), and mappel::methods::openmp::simulate_image_stack().

8.38.4.2 template<class IntType = uint32_t> template<class Function , class... Parameters> void omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run (Function *func,* Parameters... *params*) [inline]

Definition at line 57 of file OMPExceptionCatcher.h.

References omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::Abort, omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::Continue, omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::DoNotTry, and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::RethrowFirst.

Referenced by mappel::methods::openmp::cr_lower_bound_stack(), mappel::methods::openmp::error_bounds_observed_stack(), mappel::methods::openmp::error_bounds_posterior_credible_stack(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::methods::openmp::estimate_mcmc_posterior_stack(), mappel::methods::openmp::estimate_mcmc_sample_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::methods::openmp::expected_information_stack(), mappel::methods::objective::openmp::grad_stack(), mappel::methods::objective::openmp::hessian_stack(), mappel::methods::objective::openmp::llh_stack(), mappel::methods::openmp::model_image_stack(), mappel::methods::objective::openmp::negative_definite_hessian_stack(), mappel::methods::objective::openmp::rllh_stack(), mappel::methods::openmp::sample_prior_stack(), and mappel::methods::openmp::simulate_image_stack().

8.38.4.3 template<class IntType = uint32_t> static void omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::setGlobalDefaultStrategy (Strategy *s*) [inline], [static]

Definition at line 49 of file OMPExceptionCatcher.h.

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

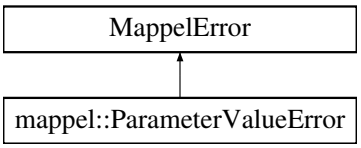
- OMPExceptionCatcher.h

8.39 mappel::ParameterValueError Struct Reference

Parameter value is not valid.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/util.h>`

Inheritance diagram for mappel::ParameterValueError:



Public Member Functions

- ParameterValueError (std::string message)

8.39.1 Detailed Description

Parameter value is not valid.

Definition at line 65 of file util.h.

8.39.2 Constructor & Destructor Documentation

8.39.2.1 mappel::ParameterValueError::ParameterValueError (std::string *message*) [inline]

Definition at line 67 of file util.h.

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

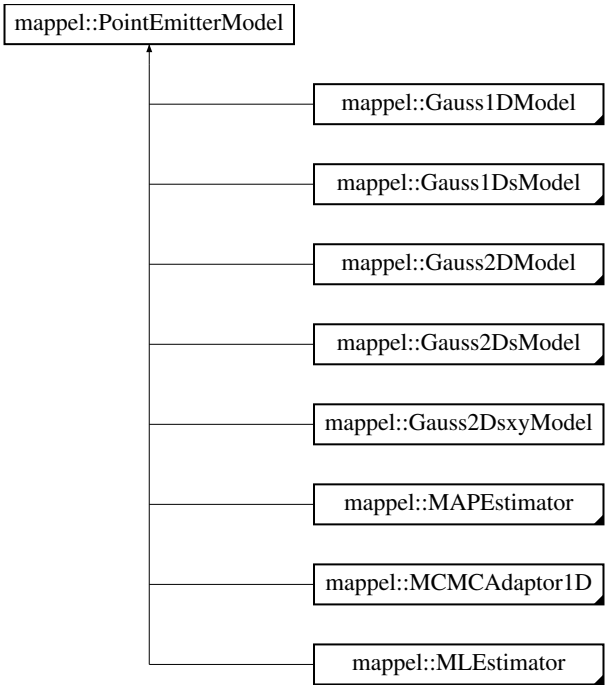
- util.h

8.40 mappel::PointEmitterModel Class Reference

A virtual Base type for point emitter localization models.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/PointEmitter↩ Model.h>`

Inheritance diagram for mappel::PointEmitterModel:



Public Types

- using ParamT = arma::vec
- using ParamVecT = arma::mat

Public Member Functions

- StatsT get_stats () const
- IdxT get_num_params () const
- void check_param_shape (const ParamT &theta) const
- void check_param_shape (const ParamVecT &theta) const
- void check_psf_sigma (double psf_sigma) const
- void check_psf_sigma (const VecT &psf_sigma) const
- ParamT make_param () const
- ParamVecT make_param_stack (IdxT n) const
- MatT make_param_mat () const
- CubeT make_param_mat_stack (IdxT n) const
- template<class FillT >
  ParamT make_param (FillT fill) const
- template<class FillT >
  ParamVecT make_param_stack (IdxT n, FillT fill) const
- template<class FillT >
  MatT make_param_mat (FillT fill) const
- template<class FillT >
  CubeT make_param_mat_stack (IdxT n, FillT fill) const
- CompositeDist & get_prior ()
- const CompositeDist & get_prior () const
- void set_prior (CompositeDist &&prior_)
- void set_prior (const CompositeDist &prior_)
- IdxT get_num_hyperparams () const
- void set_hyperparams (const VecT &hyperparams)
- VecT get_hyperparams () const
- bool has_hyperparam (const std::string &name) const
- double get_hyperparam_value (const std::string &name) const
- int get_hyperparam_index (const std::string &name) const
- void set_hyperparam_value (const std::string &name, double value)
- void rename_hyperparam (const std::string &old_name, const std::string &new_name)
- StringVecT get_param_names () const
- void set_param_names (const StringVecT &desc)
- StringVecT get_hyperparam_names () const
- void set_hyperparam_names (const StringVecT &desc)
- template<class RngT >
  ParamT sample_prior (RngT &rng)
- ParamT sample_prior ()
- void set_bounds (const ParamT &lbound, const ParamT &ubound)
- void set_lbound (const ParamT &lbound)
- void set_ubound (const ParamT &ubound)
- const ParamT & get_lbound () const
- const ParamT & get_ubound () const
- bool theta_in_bounds (const ParamT &theta) const

- void bound_theta (ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT bounded_theta (const ParamT &theta, double epsilon=bounds_epsilon) const
- ParamT reflected_theta (const ParamT &theta) const
- BoolVecT theta_stack_in_bounds (const ParamVecT &theta) const
- ParamVecT bounded_theta_stack (const ParamVecT &theta, double epsilon=bounds_epsilon) const
- ParamVecT reflected_theta_stack (const ParamVecT &theta) const

Static Public Member Functions

- static prior_hessian::TruncatedNormalDist make_prior_component_position_normal (IdxT size, double pos_↩ sigma=default_sigma_pos)
- static prior_hessian::ScaledSymmetricBetaDist make_prior_component_position_beta (IdxT size, double pos_↩ beta=default_beta_pos)
- static prior_hessian::TruncatedGammaDist make_prior_component_intensity (double mean=default_mean_↩ I, double kappa=default_intensity_kappa)
- static prior_hessian::TruncatedParetoDist make_prior_component_sigma (double min_sigma, double max_↩ sigma, double alpha=default_alpha_sigma)
- static void set_rng_seed (RngSeedT seed)
- static ParallelRngManagerT & get_rng_manager ()
- static ParallelRngGeneratorT & get_rng_generator ()

Static Public Attributes

- static const std::string DefaultSeperableInitEstimator = "TrustRegion"
- static const double bounds_epsilon = 1.0E-6
- static const double global_min_psf_sigma = 1E-1
- static const double global_max_psf_sigma = 1E2
- static const double default_beta_pos = 3
- static const double default_sigma_pos = 1
- static const double default_mean_I = 300
- static const double default_max_I = INFINITY
- static const double default_intensity_kappa = 2
- static const double default_pixel_mean_bg = 4
- static const double default_alpha_sigma = 2

Protected Member Functions

- PointEmitterModel ()
- PointEmitterModel (const CompositeDist &prior_)
- PointEmitterModel (CompositeDist &&prior_)
- PointEmitterModel (const PointEmitterModel &)
- PointEmitterModel (PointEmitterModel &&)
- PointEmitterModel & operator= (const PointEmitterModel &)
- PointEmitterModel & operator= (PointEmitterModel &&)

Protected Attributes

- CompositeDist prior
- IdxT num_params
- IdxT num_hyperparams
- ParamT lbound
- ParamT ubound

8.40.1 Detailed Description

A virtual Base type for point emitter localization models.

<Composite distribution from prior_hessian:: for representing priorsInitialized with a prior as a PriorHessian::↩ CompositeDist object, this sets the dimensionality (num_params) and num_hyperparams, and the associated descriptions.

Box-type bounding constraints are controlled with the set_bounds() method.

Of note some of the common MCMC variables are rooted here in the inheritance tree.

Definition at line 44 of file PointEmitterModel.h.

8.40.2 Member Typedef Documentation

8.40.2.1 using mappel::PointEmitterModel::ParamT = arma::vec

Parameter vector

Definition at line 47 of file PointEmitterModel.h.

8.40.2.2 using mappel::PointEmitterModel::ParamVecT = arma::mat

Vector of parameter vectors

Definition at line 48 of file PointEmitterModel.h.

8.40.3 Constructor & Destructor Documentation

8.40.3.1 mappel::PointEmitterModel::PointEmitterModel ( ) [protected]

Definition at line 30 of file PointEmitterModel.cpp.

8.40.3.2 mappel::PointEmitterModel::PointEmitterModel (const CompositeDist & *prior_*) [explicit], [protected]

Definition at line 42 of file PointEmitterModel.cpp.

8.40.3.3 mappel::PointEmitterModel::PointEmitterModel (CompositeDist && *prior_*) [explicit],[protected]

Definition at line 36 of file PointEmitterModel.cpp.

8.40.3.4 mappel::PointEmitterModel::PointEmitterModel (const PointEmitterModel & *o*) [protected]

Definition at line 48 of file PointEmitterModel.cpp.

References prior.

8.40.3.5 mappel::PointEmitterModel::PointEmitterModel (PointEmitterModel && *o*) [protected]

Definition at line 54 of file PointEmitterModel.cpp.

8.40.4 Member Function Documentation

8.40.4.1 void mappel::PointEmitterModel::bound_theta (ParamT & *theta,* double *epsilon* = bounds_epsilon) const

Definition at line 247 of file PointEmitterModel.cpp.

References check_param_shape(), lbound, num_params, and ubound.

8.40.4.2 PointEmitterModel::ParamT mappel::PointEmitterModel::bounded_theta (const ParamT & *theta,* double *epsilon* = bounds_epsilon) const

Definition at line 264 of file PointEmitterModel.cpp.

References check_param_shape(), lbound, num_params, and ubound.

Referenced by bounded_theta_stack().

8.40.4.3 PointEmitterModel::ParamVecT mappel::PointEmitterModel::bounded_theta_stack (const ParamVecT & *theta,* double *epsilon* = bounds_epsilon) const

Definition at line 306 of file PointEmitterModel.cpp.

References bounded_theta(), check_param_shape(), and make_param_stack().

8.40.4.4 void mappel::PointEmitterModel::check_param_shape (const ParamT & *theta*) const

Definition at line 166 of file PointEmitterModel.cpp.

References num_params.

Referenced by bound_theta(), bounded_theta(), bounded_theta_stack(), reflected_theta(), reflected_theta_stack(), theta_in_bounds(), and theta_stack_in_bounds().

8.40.4.5 void mappel::PointEmitterModel::check_param_shape (const ParamVecT & *theta*) const

Definition at line 175 of file PointEmitterModel.cpp.

References num_params.

8.40.4.6 void mappel::PointEmitterModel::check_psf_sigma (double *psf_sigma*) const

Definition at line 184 of file PointEmitterModel.cpp.

References global_max_psf_sigma, and global_min_psf_sigma.

Referenced by mappel::Gauss1DModel::Gauss1DModel(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss2DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), mappel::Gauss2DsModel::set_min_sigma(), mappel::Gauss1DModel::set_psf_sigma(), and mappel::Gauss2DModel::set_psf_sigma().

8.40.4.7 void mappel::PointEmitterModel::check_psf_sigma (const VecT & *psf_sigma*) const

Definition at line 196 of file PointEmitterModel.cpp.

References global_max_psf_sigma, and global_min_psf_sigma.

8.40.4.8 int mappel::PointEmitterModel::get_hyperparam_index (const std::string & *name*) const [inline]

Definition at line 236 of file PointEmitterModel.h.

References prior.

8.40.4.9 StringVecT mappel::PointEmitterModel::get_hyperparam_names ( ) const [inline]

Definition at line 256 of file PointEmitterModel.h.

References prior.

8.40.4.10 double mappel::PointEmitterModel::get_hyperparam_value (const std::string & *name*) const [inline]

Definition at line 232 of file PointEmitterModel.h.

References prior.

Referenced by mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.40.4.11 PointEmitterModel::ParamT mappel::PointEmitterModel::get_hyperparams ( ) const [inline]

Definition at line 224 of file PointEmitterModel.h.

References prior.

8.40.4.12 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_lbound ( ) const [inline]

Definition at line 212 of file PointEmitterModel.h.

References lbound.

Referenced by mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.40.4.13 IdxT mappel::PointEmitterModel::get_num_hyperparams ( ) const [inline]

Definition at line 208 of file PointEmitterModel.h.

References num_hyperparams.

8.40.4.14 IdxT mappel::PointEmitterModel::get_num_params ( ) const [inline]

Definition at line 160 of file PointEmitterModel.h.

References num_params.

8.40.4.15 StringVecT mappel::PointEmitterModel::get_param_names ( ) const [inline]

Definition at line 248 of file PointEmitterModel.h.

References prior.

8.40.4.16 CompositeDist & mappel::PointEmitterModel::get_prior ( ) [inline]

Definition at line 200 of file PointEmitterModel.h.

References prior.

Referenced by mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel↩ ::update_internal_1Dsum_estimators().

8.40.4.17 const CompositeDist & mappel::PointEmitterModel::get_prior ( ) const [inline]

Definition at line 204 of file PointEmitterModel.h.

References prior.

8.40.4.18 ParallelRngGeneratorT & mappel::PointEmitterModel::get_rng_generator ( ) [static]

Definition at line 119 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.40.4.19 ParallelRngManagerT & mappel::PointEmitterModel::get_rng_manager ( ) [static]

Definition at line 114 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.40.4.20 StatsT mappel::PointEmitterModel::get_stats ( ) const

Definition at line 124 of file PointEmitterModel.cpp.

References lbound, num_hyperparams, num_params, prior, mappel::rng_manager, and ubound.

Referenced by mappel::Gauss1DModel::get_stats(), mappel::Gauss1DsModel::get_stats(), mappel::Gauss2DModel::get_stats(), and mappel::Gauss2DsModel::get_stats().

8.40.4.21 const PointEmitterModel::ParamT & mappel::PointEmitterModel::get_ubound ( ) const [inline]

Definition at line 216 of file PointEmitterModel.h.

References ubound.

Referenced by mappel::Gauss2DsxyModel::get_max_sigma_ratio(), mappel::Gauss2DsModel::get_max_sigma_ratio(), mappel::MCMCAdaptor1D::MCMCAdaptor1D(), mappel::MCMCAdaptor2D::MCMCAdaptor2D(), mappel::MCMCAdaptor1D::set_background_mcmc_sampling(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.40.4.22 bool mappel::PointEmitterModel::has_hyperparam (const std::string & *name*) const [inline]

Definition at line 228 of file PointEmitterModel.h.

References prior.

8.40.4.23 PointEmitterModel::ParamT mappel::PointEmitterModel::make_param ( ) const [inline]

Definition at line 164 of file PointEmitterModel.h.

References num_params.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_hess_update(), mappel::Gauss1DsModel::pixel_hess_update(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_hess_update().

8.40.4.24 template<class FillT > PointEmitterModel::ParamT mappel::PointEmitterModel::make_param (FillT *fill*) const

Definition at line 181 of file PointEmitterModel.h.

References num_params.

8.40.4.25 MatT mappel::PointEmitterModel::make_param_mat ( ) const [inline]

Definition at line 172 of file PointEmitterModel.h.

References num_params.

8.40.4.26 template<class FillT > MatT mappel::PointEmitterModel::make_param_mat (FillT *fill*) const

Definition at line 191 of file PointEmitterModel.h.

References num_params.

8.40.4.27 CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n*) const [inline]

Definition at line 176 of file PointEmitterModel.h.

References num_params.

8.40.4.28 template<class FillT > CubeT mappel::PointEmitterModel::make_param_mat_stack (IdxT *n,* FillT *fill*) const

Definition at line 196 of file PointEmitterModel.h.

References num_params.

8.40.4.29 PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n*) const [inline]

Definition at line 168 of file PointEmitterModel.h.

References num_params.

Referenced by bounded_theta_stack(), and reflected_theta_stack().

8.40.4.30 template<class FillT > PointEmitterModel::ParamVecT mappel::PointEmitterModel::make_param_stack (IdxT *n,* FillT *fill*) const

Definition at line 186 of file PointEmitterModel.h.

References num_params.

8.40.4.31 prior_hessian::TruncatedGammaDist mappel::PointEmitterModel::make_prior_component_intensity (double *mean* = default_mean_I, double *kappa* = default_intensity_kappa) [static]

Definition at line 97 of file PointEmitterModel.cpp.

References default_max_I.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.40.4.32 prior_hessian::ScaledSymmetricBetaDist mappel::PointEmitterModel::make_prior_component_position_beta (IdxT *size,* double *pos_beta* = default_beta_pos) [static]

Definition at line 91 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss1DModel::make_prior_beta_position(), and mappel::Gauss2DsModel::make_prior_beta_position().

8.40.4.33 prior_hessian::TruncatedNormalDist mappel::PointEmitterModel::make_prior_component_position_normal (IdxT *size,* double *pos_sigma* = default_sigma_pos) [static]

Definition at line 84 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss1DsModel::make_prior_normal_position(), mappel::Gauss1DModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.40.4.34 prior_hessian::TruncatedParetoDist mappel::PointEmitterModel::make_prior_component_sigma (double *min_sigma,* double *max_sigma,* double *alpha* = default_alpha_sigma) [static]

Definition at line 103 of file PointEmitterModel.cpp.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::Gauss1DsModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss1DsModel::make_prior_normal_position(), and mappel::Gauss2DsModel::make_prior_normal_position().

8.40.4.35 PointEmitterModel & mappel::PointEmitterModel::operator= (const PointEmitterModel & *o*) [protected]

Definition at line 60 of file PointEmitterModel.cpp.

References prior.

Referenced by mappel::Gauss1DMAP::operator=(), mappel::Gauss1DMLE::operator=(), mappel::Gauss1DsMLE::operator=(), mappel::Gauss1DsMAP::operator=(), mappel::Gauss2DsMAP::operator=(), mappel::Gauss2DsMLE::operator=(), mappel::Gauss2DMLE::operator=(), and mappel::Gauss2DMAP::operator=().

8.40.4.36 PointEmitterModel & mappel::PointEmitterModel::operator= (PointEmitterModel && *o*) [protected]

Definition at line 67 of file PointEmitterModel.cpp.

References lbound, num_hyperparams, num_params, prior, and ubound.

8.40.4.37 PointEmitterModel::ParamT mappel::PointEmitterModel::reflected_theta (const ParamT & *theta*) const

Definition at line 275 of file PointEmitterModel.cpp.

References check_param_shape(), lbound, num_params, and ubound.

Referenced by reflected_theta_stack().

8.40.4.38 PointEmitterModel::ParamVecT mappel::PointEmitterModel::reflected_theta_stack (const ParamVecT & *theta*) const

Definition at line 316 of file PointEmitterModel.cpp.

References check_param_shape(), make_param_stack(), and reflected_theta().

8.40.4.39 void mappel::PointEmitterModel::rename_hyperparam (const std::string & *old_name,* const std::string & *new_name*) [inline]

Definition at line 244 of file PointEmitterModel.h.

References prior.

8.40.4.40 template<class RngT > PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior (RngT & *rng*)

Definition at line 264 of file PointEmitterModel.h.

References prior.

8.40.4.41 PointEmitterModel::ParamT mappel::PointEmitterModel::sample_prior ( ) [inline]

Definition at line 268 of file PointEmitterModel.h.

References prior, and mappel::rng_manager.

8.40.4.42 void mappel::PointEmitterModel::set_bounds (const ParamT & *lbound_,* const ParamT & *ubound_*)

Box-type parameter bounds

Modifies the prior bounds to prevent sampling outside the valid box-constraints.

Definition at line 212 of file PointEmitterModel.cpp.

References bounds_epsilon, lbound, num_params, prior, and ubound.

8.40.4.43 void mappel::PointEmitterModel::set_hyperparam_names (const StringVecT & *desc*) [inline]

Definition at line 260 of file PointEmitterModel.h.

References prior.

8.40.4.44 void mappel::PointEmitterModel::set_hyperparam_value (const std::string & *name,* double *value*) [inline]

Definition at line 240 of file PointEmitterModel.h.

References prior.

8.40.4.45 void mappel::PointEmitterModel::set_hyperparams (const VecT & *hyperparams*) [inline]

Definition at line 220 of file PointEmitterModel.h.

References prior.

Referenced by mappel::Gauss2DModel::set_hyperparams(), and mappel::Gauss2DsModel::set_hyperparams().

8.40.4.46 void mappel::PointEmitterModel::set_lbound (const ParamT & *lbound*)

Definition at line 225 of file PointEmitterModel.cpp.

References bounds_epsilon, lbound, num_params, prior, and ubound.

Referenced by mappel::Gauss1DsModel::set_min_sigma().

8.40.4.47 void mappel::PointEmitterModel::set_param_names (const StringVecT & *desc*) [inline]

Definition at line 252 of file PointEmitterModel.h.

References prior.

8.40.4.48 void mappel::PointEmitterModel::set_prior (CompositeDist && *prior_*)

Definition at line 157 of file PointEmitterModel.cpp.

References lbound, num_hyperparams, num_params, prior, and ubound.

Referenced by mappel::Gauss2DModel::set_prior(), and mappel::Gauss2DsModel::set_prior().

8.40.4.49 void mappel::PointEmitterModel::set_prior (const CompositeDist & *prior_*)

Definition at line 148 of file PointEmitterModel.cpp.

References lbound, num_hyperparams, num_params, prior, and ubound.

8.40.4.50 void mappel::PointEmitterModel::set_rng_seed (RngSeedT *seed*) [static]

Definition at line 109 of file PointEmitterModel.cpp.

References mappel::rng_manager.

8.40.4.51 void mappel::PointEmitterModel::set_ubound (const ParamT & *ubound*)

Definition at line 236 of file PointEmitterModel.cpp.

References bounds_epsilon, lbound, num_params, prior, and ubound.

Referenced by mappel::Gauss1DsModel::set_max_sigma(), and mappel::Gauss2DsModel::set_max_sigma_ratio().

8.40.4.52 bool mappel::PointEmitterModel::theta_in_bounds (const ParamT & *theta*) const

Definition at line 256 of file PointEmitterModel.cpp.

References check_param_shape(), lbound, num_params, and ubound.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss1DModel::make_stencil(), mappel::Gauss1DsModel::make_stencil(), mappel::Gauss2DModel::make_stencil(), mappel::Gauss2DsxyModel::make_stencil(), mappel::Gauss2DsModel::make_stencil(), and theta_stack_in_bounds().

8.40.4.53 BoolVecT mappel::PointEmitterModel::theta_stack_in_bounds (const ParamVecT & *theta*) const

Definition at line 296 of file PointEmitterModel.cpp.

References check_param_shape(), and theta_in_bounds().

8.40.5 Member Data Documentation

8.40.5.1 const double mappel::PointEmitterModel::bounds_epsilon = 1.0E-6 [static]

Distance from the boundary to constrain in bound_theta and bounded_theta methods

Definition at line 52 of file PointEmitterModel.h.

Referenced by set_bounds(), set_lbound(), mappel::Gauss2DsModel::set_max_sigma_ratio(), and set_ubound().

8.40.5.2 const double mappel::PointEmitterModel::default_alpha_sigma = 2 [static]

Default per-pixel background gamma distribution shape

Definition at line 62 of file PointEmitterModel.h.

8.40.5.3 const double mappel::PointEmitterModel::default_beta_pos = 3 [static]

Default position parameter in symmetric beta-distributions

Definition at line 56 of file PointEmitterModel.h.

8.40.5.4 const double mappel::PointEmitterModel::default_intensity_kappa = 2 [static]

Default shape for intensity gamma distributions

Definition at line 60 of file PointEmitterModel.h.

8.40.5.5 const double mappel::PointEmitterModel::default_max_I = INFINITY [static]

Default emitter intensity mean

Definition at line 59 of file PointEmitterModel.h.

Referenced by make_prior_component_intensity().

8.40.5.6 const double mappel::PointEmitterModel::default_mean_I = 300 [static]

Default emitter intensity mean

Definition at line 58 of file PointEmitterModel.h.

Referenced by mappel::MCMCAdaptor1D::set_intensity_mcmc_sampling().

8.40.5.7 const double mappel::PointEmitterModel::default_pixel_mean_bg = 4 [static]

Default per-pixel mean background counts

Definition at line 61 of file PointEmitterModel.h.

Referenced by mappel::Gauss1DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss1DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss1DsModel::make_default_prior_normal_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss1DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), and mappel::MCMCAdaptor1D::set_background_mcmc_sampling().

8.40.5.8 const double mappel::PointEmitterModel::default_sigma_pos = 1 [static]

Default position parameter in symmetric beta-distributions

Definition at line 57 of file PointEmitterModel.h.

8.40.5.9 const std::string mappel::PointEmitterModel::DefaultSeperableInitEstimator = "TrustRegion" [static]

Estimator name to use in 1D separable initializations

Definition at line 49 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsxyModel::initial_theta_estimate(), and mappel::Gauss2DsModel::initial_theta_estimate().

8.40.5.10 const double mappel::PointEmitterModel::global_max_psf_sigma = 1E2 [static]

Global maxmimum for any psf_sigma. Sizes above this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 54 of file PointEmitterModel.h.

Referenced by check_psf_sigma().

8.40.5.11 const double mappel::PointEmitterModel::global_min_psf_sigma = 1E-1 [static]

Global minimum for any psf_sigma. Sizes below this value are invalid, and nowhere near useful for practical point emitter localization

Definition at line 53 of file PointEmitterModel.h.

Referenced by check_psf_sigma().

8.40.5.12 ParamT mappel::PointEmitterModel::lbound [protected]

Definition at line 148 of file PointEmitterModel.h.

Referenced by bound_theta(), bounded_theta(), get_lbound(), get_stats(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), operator=(), reflected_theta(), set_bounds(), set_lbound(), set_prior(), set_ubound(), and theta_in_bounds().

8.40.5.13 IdxT mappel::PointEmitterModel::num_hyperparams [protected]

Definition at line 147 of file PointEmitterModel.h.

Referenced by get_num_hyperparams(), get_stats(), operator=(), and set_prior().

8.40.5.14 IdxT mappel::PointEmitterModel::num_params [protected]

Definition at line 146 of file PointEmitterModel.h.

Referenced by bound_theta(), bounded_theta(), check_param_shape(), get_num_params(), get_stats(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), make_param(), make_param_mat(), make_param_mat_stack(), make_param_stack(), operator=(), reflected_theta(), set_bounds(), set_lbound(), set_prior(), set_ubound(), and theta_in_bounds().

8.40.5.15 CompositeDist mappel::PointEmitterModel::prior [protected]

Definition at line 145 of file PointEmitterModel.h.

Referenced by mappel::Gauss2DModel::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsModel::Gauss2DsModel(), get_hyperparam_index(), get_hyperparam_names(), get_hyperparam_value(), get_hyperparams(), mappel::Gauss1DsModel::get_max_sigma(), mappel::Gauss1DsModel::get_min_sigma(), get_param_names(), get_prior(), get_stats(), has_hyperparam(), operator=(), PointEmitterModel(), rename_hyperparam(), sample_prior(), set_bounds(), set_hyperparam_names(), set_hyperparam_value(), set_hyperparams(), set_lbound(), mappel::Gauss1DsModel::set_max_sigma(), mappel::Gauss1DsModel::set_min_sigma(), set_param_names(), set_prior(), and set_ubound().

8.40.5.16 ParamT mappel::PointEmitterModel::ubound [protected]

Definition at line 148 of file PointEmitterModel.h.

Referenced by bound_theta(), bounded_theta(), get_stats(), get_ubound(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(), operator=(), reflected_theta(), set_bounds(), set_lbound(), set_prior(), set_ubound(), and theta_in_bounds().

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

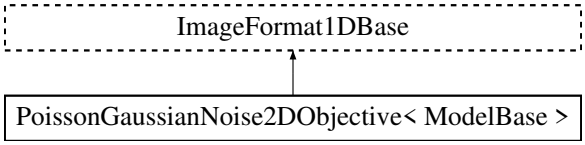
- PointEmitterModel.h
- PointEmitterModel.cpp

8.41 PoissonGaussianNoise2DObjective< ModelBase > Class Template Reference

A Base type for point emitter localization models that use 2d images.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/PoissonGaussianNoise2DObjective.h>`

Inheritance diagram for PoissonGaussianNoise2DObjective< ModelBase >:



Public Types

- using CoordIdxT = uint32_t
- using CoordT = arma::vec< uint32_t >
- using CoordStackT = arma::mat< uint32_t >
- using ModelDataT = std::pair< ImageT, CoordT >
- using ModelDataStackT = std::pair< ImageStackT, CoordStackT >

Public Member Functions

- PoissonGaussianNoise2DObjective (const ImageSizeVecT &size, const ImageT &sensor_gain_map, const ImageT &sensor_bg_map)

Public Attributes

- ImageT sensor_gain_map
- ImageT sensor_bg_map

Static Public Attributes

- static const StringVecT estimator_names

8.41.1 Detailed Description

template<typename ModelBase>
class PoissonGaussianNoise2DObjective< ModelBase >

A Base type for point emitter localization models that use 2d images.

We don't assume much here, so that it is possible to have a wide range of 2D models

Definition at line 23 of file PoissonGaussianNoise2DObjective.h.

8.41.2 Member Typedef Documentation

8.41.2.1 template<typename ModelBase > using PoissonGaussianNoise2DObjective< ModelBase >::CoordIdxT = uint32_t

Definition at line 26 of file PoissonGaussianNoise2DObjective.h.

8.41.2.2 template<typename ModelBase > using PoissonGaussianNoise2DObjective< ModelBase >::CoordStackT = arma::mat<uint32_t>

Definition at line 28 of file PoissonGaussianNoise2DObjective.h.

8.41.2.3 template<typename ModelBase > using PoissonGaussianNoise2DObjective< ModelBase >::CoordT = arma::vec<uint32_t>

Definition at line 27 of file PoissonGaussianNoise2DObjective.h.

8.41.2.4 template<typename ModelBase > using PoissonGaussianNoise2DObjective< ModelBase >::ModelDataStackT = std::pair<ImageStackT,CoordStackT>

Objective function data stack type: 2D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 30 of file PoissonGaussianNoise2DObjective.h.

8.41.2.5 template<typename ModelBase > using PoissonGaussianNoise2DObjective< ModelBase >::ModelDataT = std::pair<ImageT, CoordT>

Objective function data type: 2D double precision image, gain-corrected to approximate photons counts

Definition at line 29 of file PoissonGaussianNoise2DObjective.h.

8.41.3 Constructor & Destructor Documentation

8.41.3.1 template<typename ModelBase > PoissonGaussianNoise2DObjective< ModelBase >::PoissonGaussian↩ Noise2DObjective (const ImageSizeVecT & *size,* const ImageT & *sensor_gain_map,* const ImageT & *sensor_bg_map*)

8.41.4 Member Data Documentation

8.41.4.1 template<typename ModelBase > const std::vector< std::string > PoissonGaussianNoise2DObjective< ModelBase >::estimator_names [static]

Definition at line 25 of file PoissonGaussianNoise2DObjective.h.

8.41.4.2 template<typename ModelBase > ImageT PoissonGaussianNoise2DObjective< ModelBase >::sensor_bg_map

Definition at line 34 of file PoissonGaussianNoise2DObjective.h.

8.41.4.3 template<typename ModelBase > ImageT PoissonGaussianNoise2DObjective< ModelBase >::sensor_gain_map

Definition at line 33 of file PoissonGaussianNoise2DObjective.h.

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

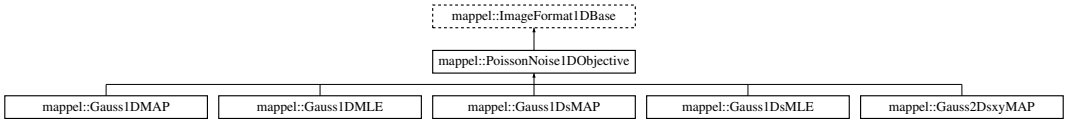
- PoissonGaussianNoise2DObjective.h
- PoissonGaussianNoise2DObjective.cpp

8.42 mappel::PoissonNoise1DObjective Class Reference

A base class for 1D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/PoissonNoise1D↩ Objective.h>`

Inheritance diagram for mappel::PoissonNoise1DObjective:



Public Types

- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = CoordT
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Col< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Col< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Mat< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >

Public Member Functions

- StatsT get_stats () const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- ImageSizeT get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void set_size (const arma::Col< ImageCoordT > &sz)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.

Static Public Member Functions

- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::vector< std::string > estimator_names
- static const ImageCoordT num_dim = 1
- static const ImageCoordT global_min_size = 3
- static const ImageCoordT global_max_size = 512

Protected Member Functions

- PoissonNoise1DObjective ()
- PoissonNoise1DObjective (const PoissonNoise1DObjective &o)
- PoissonNoise1DObjective (PoissonNoise1DObjective &&o)
- PoissonNoise1DObjective & operator= (const PoissonNoise1DObjective &o)
- PoissonNoise1DObjective & operator= (PoissonNoise1DObjective &&o)

Protected Attributes

- ImageSizeT size

8.42.1 Detailed Description

A base class for 1D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel.

Definition at line 22 of file PoissonNoise1DObjective.h.

8.42.2 Member Typedef Documentation

8.42.2.1 using mappel::ImageFormat1DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 25 of file ImageFormat1DBase.h.

8.42.2.2 using mappel::ImageFormat1DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 26 of file ImageFormat1DBase.h.

8.42.2.3 template<class PixelT > using mappel::ImageFormat1DBase::ImageShapeT = arma::Col<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 33 of file ImageFormat1DBase.h.

8.42.2.4 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeShapeT = CoordT [inherited]

Shape of the data type to store 1-image's coordinates

Definition at line 28 of file ImageFormat1DBase.h.

8.42.2.5 using mappel::ImageFormat1DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 30 of file ImageFormat1DBase.h.

8.42.2.6 template<class CoordT > using mappel::ImageFormat1DBase::ImageSizeVecShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 29 of file ImageFormat1DBase.h.

8.42.2.7 using mappel::ImageFormat1DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 31 of file ImageFormat1DBase.h.

8.42.2.8 template<class PixelT > using mappel::ImageFormat1DBase::ImageStackShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 34 of file ImageFormat1DBase.h.

8.42.2.9 using mappel::ImageFormat1DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 36 of file ImageFormat1DBase.h.

8.42.2.10 using mappel::ImageFormat1DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 35 of file ImageFormat1DBase.h.

8.42.2.11 using mappel::PoissonNoise1DObjective::ModelDataStackT = ImageStackT

Objective function data stack type: 1D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 26 of file PoissonNoise1DObjective.h.

8.42.2.12 using mappel::PoissonNoise1DObjective::ModelDataT = ImageT

Objective function data type: 1D double precision image, gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise1DObjective.h.

8.42.3 Constructor & Destructor Documentation

8.42.3.1 mappel::PoissonNoise1DObjective::PoissonNoise1DObjective ( ) [protected]

Definition at line 14 of file PoissonNoise1DObjective.cpp.

8.42.3.2 mappel::PoissonNoise1DObjective::PoissonNoise1DObjective (const PoissonNoise1DObjective & *o*) [protected]

Definition at line 18 of file PoissonNoise1DObjective.cpp.

8.42.3.3 mappel::PoissonNoise1DObjective::PoissonNoise1DObjective (PoissonNoise1DObjective && *o*) [protected]

Definition at line 22 of file PoissonNoise1DObjective.cpp.

8.42.4 Member Function Documentation

8.42.4.1 void ImageFormat1DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 59 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.42.4.2 void ImageFormat1DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 71 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.42.4.3 void ImageFormat1DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 39 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::global_max_size, and mappel::ImageFormat1DBase::global_min_size.

Referenced by mappel::ImageFormat1DBase::ImageFormat1DBase(), and mappel::ImageFormat1DBase::set_size().

8.42.4.4 ImageFormat1DBase::ImageT ImageFormat1DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 108 of file ImageFormat1DBase.h.

8.42.4.5 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 82 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.42.4.6 ImageFormat1DBase::ImageSizeT ImageFormat1DBase::get_size ( ) const [inline], [inherited]

Definition at line 71 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.42.4.7 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 20 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::size.

8.42.4.8 ImageFormat1DBase::ImageCoordT ImageFormat1DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 101 of file ImageFormat1DBase.h.

8.42.4.9 StatsT ImageFormat1DBase::get_stats ( ) const [inherited]

Definition at line 81 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::get_num_pixels(), mappel::ImageFormat1DBase::get_size(), and mappel↩ ::ImageFormat1DBase::num_dim.

Referenced by mappel::Gauss1DModel::get_stats(), and mappel::Gauss1DsModel::get_stats().

8.42.4.10 ImageFormat1DBase::ImageT ImageFormat1DBase::make_image ( ) const [inline], [inherited]

Definition at line 87 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.42.4.11 ImageFormat1DBase::ImageStackT ImageFormat1DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 94 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::size.

8.42.4.12 PoissonNoise1DObjective & mappel::PoissonNoise1DObjective::operator= (const PoissonNoise1DObjective & *o*) [protected]

Definition at line 26 of file PoissonNoise1DObjective.cpp.

Referenced by mappel::Gauss1DMAP::operator=(), mappel::Gauss1DMLE::operator=(), mappel::Gauss1DsMAP↩ ::operator=(), and mappel::Gauss1DsMLE::operator=().

8.42.4.13 PoissonNoise1DObjective & mappel::PoissonNoise1DObjective::operator= (PoissonNoise1DObjective && *o*) [protected]

Definition at line 31 of file PoissonNoise1DObjective.cpp.

8.42.4.14 template<class ImT > void ImageFormat1DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 115 of file ImageFormat1DBase.h.

8.42.4.15 void ImageFormat1DBase::set_size (const ImageSizeT & *size_*) [inherited]

Definition at line 30 of file ImageFormat1DBase.cpp.

References mappel::ImageFormat1DBase::check_size(), and mappel::ImageFormat1DBase::size.

Referenced by mappel::ImageFormat1DBase::set_size(), mappel::Gauss2DModel::set_size(), and mappel::Gauss2↩ DsModel::set_size().

8.42.4.16 void ImageFormat1DBase::set_size (const arma::Col< ImageCoordT > & *sz*) [inline], [inherited]

Definition at line 75 of file ImageFormat1DBase.h.

References mappel::ImageFormat1DBase::set_size().

8.42.5 Member Data Documentation

8.42.5.1 const std::vector< std::string > mappel::PoissonNoise1DObjective::estimator_names [static]

Definition at line 24 of file PoissonNoise1DObjective.h.

8.42.5.2 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_max_size = 512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 40 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.42.5.3 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::global_min_size = 3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 39 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_size().

8.42.5.4 const ImageFormat1DBase::ImageCoordT ImageFormat1DBase::num_dim = 1 [static], [inherited]

Number of image dimensions.

Definition at line 38 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::get_stats().

8.42.5.5 ImageSizeT mappel::ImageFormat1DBase::size [protected], [inherited]

Number of pixels in X dimension for 1D image

Definition at line 65 of file ImageFormat1DBase.h.

Referenced by mappel::ImageFormat1DBase::check_image_shape(), mappel::Gauss1DsModel::Stencil::compute_derivatives(), mappel::Gauss1DModel::Stencil::compute_derivatives(), mappel::ImageFormat1DBase::get_num_pixels(), mappel::ImageFormat1DBase::get_size(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::ImageFormat1DBase::make_image(), mappel::ImageFormat1DBase::make_image_stack(), mappel::ImageFormat1DBase::set_size(), mappel::Gauss1DsModel::Stencil::Stencil(), and mappel::Gauss1DModel::Stencil::Stencil().

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

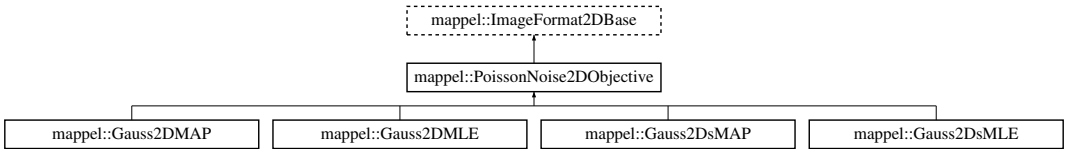
- PoissonNoise1DObjective.h
- PoissonNoise1DObjective.cpp

8.43 mappel::PoissonNoise2DObjective Class Reference

A base class for 2D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/PoissonNoise2DObjective.h>`

Inheritance diagram for mappel::PoissonNoise2DObjective:



Public Types

- using ModelDataT = ImageT
- using ModelDataStackT = ImageStackT
- using ImageCoordT = uint32_t
- using ImagePixelT = double
- template<class CoordT >
  using ImageSizeShapeT = arma::Col< CoordT >
- template<class CoordT >
  using ImageSizeVecShapeT = arma::Mat< CoordT >
- using ImageSizeT = ImageSizeShapeT< ImageCoordT >
- using ImageSizeVecT = ImageSizeVecShapeT< ImageCoordT >
- template<class PixelT >
  using ImageShapeT = arma::Mat< PixelT >
- template<class PixelT >
  using ImageStackShapeT = arma::Cube< PixelT >
- using ImageT = ImageShapeT< ImagePixelT >
- using ImageStackT = ImageStackShapeT< ImagePixelT >

Public Member Functions

- StatsT get_stats () const
- ImageT make_image () const
- ImageStackT make_image_stack (ImageCoordT n) const
- ImageCoordT get_size_image_stack (const ImageStackT &stack) const
- ImageT get_image_from_stack (const ImageStackT &stack, ImageCoordT n) const
- template<class ImT >
  void set_image_in_stack (ImageStackT &stack, ImageCoordT n, const ImT &im) const
- const ImageSizeT & get_size () const
- ImageCoordT get_size (IdxT idx) const
- ImageCoordT get_num_pixels () const
- void set_size (const ImageSizeT &size_)
- void check_image_shape (const ImageT &im) const

  Check the shape of a single images is correct for model size.
- void check_image_shape (const ImageStackT &ims) const

  Check the shape of a stack of images is correct for model size.

Static Public Member Functions

- static void check_size (const ImageSizeT &size_)

  Check the size argument for the model.

Static Public Attributes

- static const std::vector< std::string > estimator_names
- static const ImageCoordT num_dim =2
- static const ImageCoordT global_min_size =3
- static const ImageCoordT global_max_size =512

Protected Member Functions

- PoissonNoise2DObjective ()
- PoissonNoise2DObjective (const PoissonNoise2DObjective &o)
- PoissonNoise2DObjective (PoissonNoise2DObjective &&o)
- PoissonNoise2DObjective & operator= (const PoissonNoise2DObjective &o)
- PoissonNoise2DObjective & operator= (PoissonNoise2DObjective &&o)

Protected Attributes

- ImageSizeT size

8.43.1 Detailed Description

A base class for 2D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel.

Definition at line 21 of file PoissonNoise2DObjective.h.

8.43.2 Member Typedef Documentation

8.43.2.1 using mappel::ImageFormat2DBase::ImageCoordT = uint32_t [inherited]

Image size coordinate storage type

Definition at line 24 of file ImageFormat2DBase.h.

8.43.2.2 using mappel::ImageFormat2DBase::ImagePixelT = double [inherited]

Image pixel storage type

Definition at line 25 of file ImageFormat2DBase.h.

8.43.2.3 template<class PixelT > using mappel::ImageFormat2DBase::ImageShapeT = arma::Mat<PixelT> [inherited]

Shape of the data type for a single image

Definition at line 32 of file ImageFormat2DBase.h.

8.43.2.4 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeShapeT = arma::Col<CoordT> [inherited]

Shape of the data type to store a single image's coordinates

Definition at line 27 of file ImageFormat2DBase.h.

8.43.2.5 using mappel::ImageFormat2DBase::ImageSizeT = ImageSizeShapeT<ImageCoordT> [inherited]

Data type for a single image size

Definition at line 29 of file ImageFormat2DBase.h.

8.43.2.6 template<class CoordT > using mappel::ImageFormat2DBase::ImageSizeVecShapeT = arma::Mat<CoordT> [inherited]

Shape of the data type to store a vector of image's coordinates

Definition at line 28 of file ImageFormat2DBase.h.

8.43.2.7 using mappel::ImageFormat2DBase::ImageSizeVecT = ImageSizeVecShapeT<ImageCoordT> [inherited]

Data type for a sequence of image sizes

Definition at line 30 of file ImageFormat2DBase.h.

8.43.2.8 template<class PixelT > using mappel::ImageFormat2DBase::ImageStackShapeT = arma::Cube<PixelT> [inherited]

Shape of the data type for a sequence of images

Definition at line 33 of file ImageFormat2DBase.h.

8.43.2.9 using mappel::ImageFormat2DBase::ImageStackT = ImageStackShapeT<ImagePixelT> [inherited]

Data type to represent a sequence of images

Definition at line 35 of file ImageFormat2DBase.h.

8.43.2.10 using mappel::ImageFormat2DBase::ImageT = ImageShapeT<ImagePixelT> [inherited]

Data type to represent single image

Definition at line 34 of file ImageFormat2DBase.h.

8.43.2.11 using mappel::PoissonNoise2DObjective::ModelDataStackT = ImageStackT

Objective function data stack type: 2D double precision image stack, of images gain-corrected to approximate photons counts

Definition at line 25 of file PoissonNoise2DObjective.h.

8.43.2.12 using mappel::PoissonNoise2DObjective::ModelDataT = ImageT

Objective function data type: 2D double precision image, gain-corrected to approximate photons counts

Definition at line 24 of file PoissonNoise2DObjective.h.

8.43.3 Constructor & Destructor Documentation

8.43.3.1 mappel::PoissonNoise2DObjective::PoissonNoise2DObjective ( ) [protected]

Definition at line 15 of file PoissonNoise2DObjective.cpp.

8.43.3.2 mappel::PoissonNoise2DObjective::PoissonNoise2DObjective (const PoissonNoise2DObjective & *o*) [protected]

Definition at line 19 of file PoissonNoise2DObjective.cpp.

8.43.3.3 mappel::PoissonNoise2DObjective::PoissonNoise2DObjective (PoissonNoise2DObjective && *o*) [protected]

Definition at line 23 of file PoissonNoise2DObjective.cpp.

8.43.4 Member Function Documentation

8.43.4.1 void mappel::ImageFormat2DBase::check_image_shape (const ImageT & *im*) const [inherited]

Check the shape of a single images is correct for model size.

Definition at line 80 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.43.4.2 void mappel::ImageFormat2DBase::check_image_shape (const ImageStackT & *ims*) const [inherited]

Check the shape of a stack of images is correct for model size.

Definition at line 93 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.43.4.3 void mappel::ImageFormat2DBase::check_size (const ImageSizeT & *size_*) [static], [inherited]

Check the size argument for the model.

Definition at line 60 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::global_max_size, and mappel::ImageFormat2DBase::global_min_size.

Referenced by mappel::ImageFormat2DBase::ImageFormat2DBase(), and mappel::ImageFormat2DBase::set_size().

8.43.4.4 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::get_image_from_stack (const ImageStackT & *stack,* ImageCoordT *n*) const [inline], [inherited]

Definition at line 106 of file ImageFormat2DBase.h.

8.43.4.5 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_num_pixels ( ) const [inline], [inherited]

Definition at line 79 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.43.4.6 const ImageFormat2DBase::ImageSizeT & mappel::ImageFormat2DBase::get_size ( ) const [inline], [inherited]

Definition at line 74 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.43.4.7 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size (IdxT *idx*) const [inherited]

Definition at line 41 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::size.

8.43.4.8 ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::get_size_image_stack (const ImageStackT & *stack*) const [inline], [inherited]

Definition at line 99 of file ImageFormat2DBase.h.

8.43.4.9 StatsT mappel::ImageFormat2DBase::get_stats ( ) const [inherited]

Definition at line 103 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::get_num_pixels(), mappel::ImageFormat2DBase::num_dim, and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DModel::get_stats(), and mappel::Gauss2DsModel::get_stats().

8.43.4.10 ImageFormat2DBase::ImageT mappel::ImageFormat2DBase::make_image ( ) const [inline], [inherited]

Definition at line 85 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.43.4.11 ImageFormat2DBase::ImageStackT mappel::ImageFormat2DBase::make_image_stack (ImageCoordT *n*) const [inline], [inherited]

Definition at line 92 of file ImageFormat2DBase.h.

References mappel::ImageFormat2DBase::size.

8.43.4.12 PoissonNoise2DObjective & mappel::PoissonNoise2DObjective::operator= (const PoissonNoise2DObjective & *o*) [protected]

Definition at line 27 of file PoissonNoise2DObjective.cpp.

Referenced by mappel::Gauss2DsMAP::operator=(), mappel::Gauss2DsMLE::operator=(), mappel::Gauss2DMAP::operator=(), and mappel::Gauss2DMLE::operator=().

8.43.4.13 PoissonNoise2DObjective & mappel::PoissonNoise2DObjective::operator= (PoissonNoise2DObjective && *o*) [protected]

Definition at line 32 of file PoissonNoise2DObjective.cpp.

8.43.4.14 template<class ImT > void mappel::ImageFormat2DBase::set_image_in_stack (ImageStackT & *stack,* ImageCoordT *n,* const ImT & *im*) const [inherited]

Definition at line 113 of file ImageFormat2DBase.h.

8.43.4.15 void mappel::ImageFormat2DBase::set_size (const ImageSizeT & *size_*) [inherited]

Definition at line 51 of file ImageFormat2DBase.cpp.

References mappel::ImageFormat2DBase::check_size(), and mappel::ImageFormat2DBase::size.

Referenced by mappel::Gauss2DModel::set_size(), and mappel::Gauss2DsModel::set_size().

8.43.5 Member Data Documentation

8.43.5.1 const std::vector< std::string > mappel::PoissonNoise2DObjective::estimator_names [static]

Definition at line 23 of file PoissonNoise2DObjective.h.

8.43.5.2 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_max_size =512 [static], [inherited]

Maximum size along any dimension of the image. This is insanely big to catch obvious errors

Definition at line 39 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.43.5.3 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::global_min_size =3 [static], [inherited]

Minimum size along any dimension of the image.

Definition at line 38 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::check_size().

8.43.5.4 const ImageFormat2DBase::ImageCoordT mappel::ImageFormat2DBase::num_dim =2 [static], [inherited]

Number of image dimensions.

Definition at line 37 of file ImageFormat2DBase.h.

Referenced by mappel::ImageFormat2DBase::get_stats().

8.43.5.5 ImageSizeT mappel::ImageFormat2DBase::size [protected], [inherited]

Number of pixels in X dimension for 1D image

Definition at line 67 of file ImageFormat2DBase.h.

Referenced by mappel::cgauss_compute_estimate(), mappel::cgauss_compute_estimate_debug(), mappel::cgauss↩
_heuristic_compute_estimate(), mappel::ImageFormat2DBase::check_image_shape(), mappel::Gauss2DModel::↩
Stencil::compute_derivatives(), mappel::Gauss2DsModel::Stencil::compute_derivatives(), mappel::Gauss2DModel↩
::debug_internal_sum_model_y(), mappel::Gauss2DsModel::debug_internal_sum_model_y(), mappel::methods↩
::expected_information(), mappel::Gauss2DModel::Gauss2DModel(), mappel::Gauss2DsMAP::Gauss2DsMA↩
P(), mappel::Gauss2DsMLE::Gauss2DsMLE(), mappel::Gauss2DsModel::Gauss2DsModel(), mappel::Image↩
Format2DBase::get_num_pixels(), mappel::ImageFormat2DBase::get_size(), mappel::ImageFormat2DBase::get↩
_stats(), mappel::methods::likelihood::grad(), mappel::methods::likelihood::grad2(), mappel::methods::likelihood↩
::debug::grad_components(), mappel::methods::likelihood::hessian(), mappel::methods::likelihood::debug::hessian↩
_components(), mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DsModel::initial_theta_estimate(),

mappel::methods::likelihood::llh(), mappel::methods::likelihood::debug::llh_components(), mappel::Gauss2DModel::make_default_prior_beta_position(), mappel::Gauss2DsModel::make_default_prior_beta_position(), mappel::Gauss2DModel::make_default_prior_normal_position(), mappel::Gauss2DsModel::make_default_prior_normal_position(), mappel::ImageFormat2DBase::make_image(), mappel::ImageFormat2DBase::make_image_stack(), mappel::Gauss2DModel::make_internal_1Dsum_estimator(), mappel::Gauss2DsModel::make_internal_1Dsum_estimator(), mappel::Gauss2DModel::make_prior_beta_position(), mappel::Gauss2DsModel::make_prior_beta_position(), mappel::Gauss2DModel::make_prior_normal_position(), mappel::Gauss2DsModel::make_prior_normal_position(), mappel::methods::model_image(), mappel::ImageFormat2DBase::operator=(), mappel::methods::likelihood::rllh(), mappel::methods::likelihood::debug::rllh_components(), mappel::ImageFormat2DBase::set_size(), mappel::Gauss2DModel::set_size(), mappel::Gauss2DsModel::set_size(), mappel::methods::simulate_image(), mappel::methods::simulate_image_from_model(), mappel::Gauss2DModel::Stencil::Stencil(), mappel::Gauss2DsModel::Stencil::Stencil(), mappel::Gauss2DModel::update_internal_1Dsum_estimators(), and mappel::Gauss2DsModel::update_internal_1Dsum_estimators().

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

- PoissonNoise2DObjective.h
- PoissonNoise2DObjective.cpp

8.44 mappel::PriorMAP1DObjective Class Reference

A Mixin class to configure a Gauss1DModel for MAP estimation (default 1D prior).

`#include </home/travis/build/markjolah/Mappel/include/Mappel/PriorMAP1DObjective.h>`

Protected Types

- using ParamT = arma::vec
- using ParamMatT = arma::mat

Protected Member Functions

- void set_hyperparameters (double beta_x, double mean_I, double kappa_I, double mean_bg, double kappa_bg) public
- double prior_log_likelihood (const ParamT &theta) const
- double prior_relative_log_likelihood (const ParamT &theta) const
- void prior_grad_update (const ParamT &theta, ParamT &grad) const
- void prior_grad2_update (const ParamT &theta, ParamT &grad2) const
- void prior_hess_update (const ParamT &theta, ParamMatT &hess) const

Protected Attributes

- double log_prior_pos_const
- double log_prior_I_const
- double log_prior_bg_const

8.44.1 Detailed Description

A Mixin class to configure a Gauss1DModel for MAP estimation (default 1D prior).

Definition at line 18 of file PriorMAP1DObjective.h.

8.44.2 Member Typedef Documentation

8.44.2.1 using mappel::PriorMAP1DObjective::ParamMatT = arma::mat [protected]

Definition at line 22 of file PriorMAP1DObjective.h.

8.44.2.2 using mappel::PriorMAP1DObjective::ParamT = arma::vec [protected]

Definition at line 21 of file PriorMAP1DObjective.h.

8.44.3 Member Function Documentation

8.44.3.1 void mappel::PriorMAP1DObjective::prior_grad2_update (const ParamT & *theta,* ParamT & *grad2*) const [inline], [protected]

Definition at line 72 of file PriorMAP1DObjective.h.

References mappel::beta_prior_grad2(), mappel::gamma_prior_grad2(), and mappel::methods::objective::grad2().

Referenced by set_hyperparameters().

8.44.3.2 void mappel::PriorMAP1DObjective::prior_grad_update (const ParamT & *theta,* ParamT & *grad*) const [inline], [protected]

Definition at line 64 of file PriorMAP1DObjective.h.

References mappel::beta_prior_grad(), mappel::gamma_prior_grad(), and mappel::methods::objective::grad().

Referenced by set_hyperparameters().

8.44.3.3 void mappel::PriorMAP1DObjective::prior_hess_update (const ParamT & *theta,* ParamMatT & *hess*) const [inline], [protected]

Definition at line 80 of file PriorMAP1DObjective.h.

References mappel::beta_prior_grad2(), and mappel::gamma_prior_grad2().

Referenced by set_hyperparameters().

8.44.3.4 double mappel::PriorMAP1DObjective::prior_log_likelihood (const ParamT & *theta*) const [inline], [protected]

Definition at line 48 of file PriorMAP1DObjective.h.

References log_prior_bg_const, log_prior_l_const, log_prior_pos_const, prior_relative_log_likelihood(), and mappel↩ ::methods::objective::rllh().

Referenced by set_hyperparameters().

8.44.3.5 double mappel::PriorMAP1DObjective::prior_relative_log_likelihood (const ParamT & *theta*) const [inline], [protected]

Definition at line 55 of file PriorMAP1DObjective.h.

References mappel::rllh_beta_prior(), and mappel::rllh_gamma_prior().

Referenced by prior_log_likelihood(), and set_hyperparameters().

8.44.3.6 void mappel::PriorMAP1DObjective::set_hyperparameters (double *beta_x,* double *mean_l,* double *kappa_l,* double *mean_bg,* double *kappa_bg*) [inline], [protected]

Definition at line 31 of file PriorMAP1DObjective.h.

References mappel::methods::objective::grad(), mappel::methods::objective::grad2(), prior_grad2_update(), prior_↩ grad_update(), prior_hess_update(), prior_log_likelihood(), and prior_relative_log_likelihood().

8.44.4 Member Data Documentation

8.44.4.1 double mappel::PriorMAP1DObjective::log_prior_bg_const [protected]

This is kappa_bg∗(log(kappa_bg)-1/mean_bg-log(mean_bg))-lgamma(kappa_bg)

Definition at line 30 of file PriorMAP1DObjective.h.

Referenced by prior_log_likelihood().

8.44.4.2 double mappel::PriorMAP1DObjective::log_prior_l_const [protected]

This is kappa_l∗(log(kappa_l)-1/mean_l-log(mean_l))-lgamma(kappa_l)

Definition at line 29 of file PriorMAP1DObjective.h.

Referenced by prior_log_likelihood().

8.44.4.3 double mappel::PriorMAP1DObjective::log_prior_pos_const [protected]

This is -2*lgamma(beta_x)-lgamma(2*beta_x)

Definition at line 28 of file PriorMAP1DObjective.h.

Referenced by prior_log_likelihood().

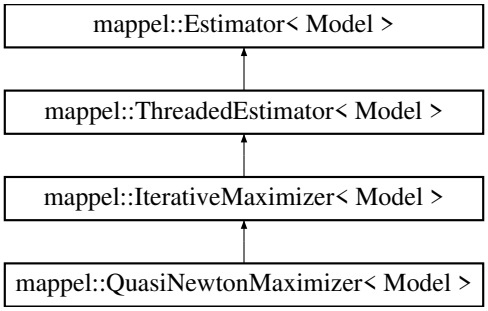
The documentation for this class was generated from the following file:

- PriorMAP1DObjective.h

8.45 mappel::QuasiNewtonMaximizer< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::QuasiNewtonMaximizer< Model >:



Public Types

- using MaximizerData = typename IterativeMaximizer< Model >::MaximizerData
- enum ExitCode : IdxT {
  ExitCode::Unassigned = 99, ExitCode::MaxIter = 6, ExitCode::MaxBacktracks = 5, ExitCode::TrustRegionRadius = 4,
  ExitCode::GradRatio = 3, ExitCode::FunctionChange = 2, ExitCode::StepSize = 1, ExitCode::Error = 0 }

Public Member Functions

- QuasiNewtonMaximizer (Model &model, int max_iterations=DEFAULT_ITERATIONS)
- std::string name () const
- double mean_iterations ()
- double mean_backtracks ()
- double mean_fun_evals ()
- double mean_der_evals ()
- StatsT get_stats ()
- StatsT get_debug_stats ()
- void clear_stats ()

- void local_maximize (const ModelDataT< Model > &im, const StencilT< Model > &theta_init, StencilT< Model > &stencil, double &rllh)

  Perform a local maximization to finish off a simulated annealing run.
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩ stack, VecT &rllh_stack, CubeT &obsI_stack)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_↩ parameters)
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)

Static Public Attributes

- static constexpr int NumExitCodes = 7

Protected Member Functions

- void maximize (MaximizerData &data)
- void record_run_statistics (const MaximizerData &data)
- StencilT< Model > compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- virtual void maximize (MaximizerData &data)=0
- bool backtrack (MaximizerData &data)
- bool convergence_test (MaximizerData &data)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- int max_iterations
- double epsilon = sqrt(std::numeric_limits<double>::epsilon())
- double delta = sqrt(std::numeric_limits<double>::epsilon())
- double lambda_min = 0.05
- double alpha = 1e-4
- int max_backtracks = 8
- int total_iterations = 0
- int total_backtracks = 0
- int total_fun_evals = 0
- int total_der_evals = 0
- IdxVecT exit_counts
- IdxVecT last_backtrack_idxs
- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.45.1 Detailed Description

template<class Model>
class mappel::QuasiNewtonMaximizer< Model >

Definition at line 350 of file estimator.h.

8.45.2 Member Typedef Documentation

8.45.2.1 template<class Model > using mappel::QuasiNewtonMaximizer< Model >::MaximizerData = typename IterativeMaximizer<Model>::MaximizerData

Definition at line 352 of file estimator.h.

8.45.3 Member Enumeration Documentation

8.45.3.1 template<class Model > enum mappel::IterativeMaximizer::ExitCode : IdxT [strong], [inherited]

Enumerator

Unassigned

MaxIter

MaxBacktracks

TrustRegionRadius

GradRatio

FunctionChange

StepSize

Error

Definition at line 198 of file estimator.h.

8.45.4 Constructor & Destructor Documentation

8.45.4.1 template<class Model > mappel::QuasiNewtonMaximizer< Model >::QuasiNewtonMaximizer (Model & *model,* int *max_iterations* = DEFAULT_ITERATIONS) [inline]

Definition at line 354 of file estimator.h.

8.45.5 Member Function Documentation

8.45.5.1 template<class Model > bool mappel::IterativeMaximizer< Model >::backtrack (MaximizerData & *data*) [protected], [inherited]

Definition at line 530 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::alpha, mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::im, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration(), mappel::IterativeMaximizer< Model >::MaximizerData::restore_stencil(), mappel::methods::objective::rllh(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::save_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::MaximizerData::set_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::step.

Referenced by mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.45.5.2 template<class Model > void mappel::IterativeMaximizer< Model >::clear_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 504 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::exit_counts, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::IterativeMaximizer< Model >::total_iterations.

8.45.5.3 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.45.5.4 template<class Model > StencilT< Model > mappel::IterativeMaximizer< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [protected], [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 628 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::print_image(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.45.5.5 template<class Model > StencilT< Model > mappel::IterativeMaximizer< Model >::compute_estimate_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamVecT< Model > & *sequence,* VecT & *sequence_rllh*) [protected], [virtual], [inherited]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented from mappel::Estimator< Model >.

Definition at line 653 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence_rllh(), mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

8.45.5.6 template<class Model > void mappel::IterativeMaximizer< Model >::compute_profile_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* const IdxVecT & *fixed_parameters,* ParamT< Model > & *theta_est,* double & *rllh*) [protected], [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Definition at line 672 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::set_fixed_parameters(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.45.5.7 template<class Model > bool mappel::IterativeMaximizer< Model >::convergence_test (MaximizerData & *data*) [protected], [inherited]

Definition at line 606 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::StepSize, and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.45.5.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.45.5.9 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.45.5.10 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.45.5.11 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.45.5.12 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.45.5.13 template<class Model > void **mappel::Estimator**< Model >::estimate_max (const **ModelDataT**< Model > & *im*, const **ParamT**< Model > & *theta_init*, **ParamT**< Model > & *theta*, double & *rllh*, **MatT** & *obsI*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.45.5.14 template<class Model > void **mappel::Estimator**< Model >::estimate_max_debug (const **ModelDataT**< Model > & *im*, const **ParamT**< Model > & *theta_init*, **ParamT**< Model > & *theta_est*, double & *rllh*, **MatT** & *obsI*, **MatT** & *sequence*, **VecT** & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.45.5.15 template<class Model > void **mappel::Estimator**< Model >::estimate_max_stack (const **ModelDataStackT**< Model > & *im_stack*, **ParamVecT**< Model > & *theta_est_stack*, **VecT** & *rllh_stack*, **CubeT** & *obsI_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.45.5.16 template<class Model > void **mappel::ThreadedEstimator**< Model >::estimate_max_stack (const **ModelDataStackT**< Model > & *im*, const **ParamVecT**< Model > & *theta_init*, **ParamVecT**< Model > & *theta*, **VecT** & *rllh*, **CubeT** & *obsI*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.45.5.17 template<class Model > void **mappel::ThreadedEstimator**< Model >::estimate_profile_stack (const **ModelDataT**< Model > & *data*, const **IdxVecT** & *fixed_parameters*, const **MatT** & *values*, const **ParamVecT**< Model > & *theta_init*, **VecT** & *profile_likelihood*, **ParamVecT**< Model > & *profile_parameters*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.45.5.18 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_debug_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 488 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::backtrack_idxs, mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::last_backtrack_idxs.

8.45.5.19 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.45.5.20 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 459 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::ThreadedEstimator< Model >::get_stats(), mappel::IterativeMaximizer< Model >::GradRatio, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::IterativeMaximizer< Model >::MaxIter, mappel::ThreadedEstimator< Model >::mtx, mappel::Estimator< Model >::num_estimations, mappel::IterativeMaximizer< Model >::StepSize, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, mappel::IterativeMaximizer< Model >::total_iterations, and mappel::IterativeMaximizer< Model >::TrustRegionRadius.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats().

8.45.5.21 template<class Model > void mappel::IterativeMaximizer< Model >::local_maximize (const ModelDataT< Model > & *im,* const StencilT< Model > & *theta_init,* StencilT< Model > & *stencil,* double & *rllh*) [inherited]

Perform a local maximization to finish off a simulated annealing run.

Definition at line 690 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::rllh, and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal().

8.45.5.22 template<class Model > virtual void mappel::IterativeMaximizer< Model >::maximize (MaximizerData & *data*) [protected], [pure virtual], [inherited]

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), and mappel::IterativeMaximizer< Model >::local_maximize().

8.45.5.23 template<class Model > void mappel::QuasiNewtonMaximizer< Model >::maximize (MaximizerData & *data*) [protected]

Definition at line 787 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::convergence_test(), mappel::methods::objective::grad(), mappel::methods::objective::hessian(), mappel::is_positive_definite(), mappel::IterativeMaximizer< Model >::max_iterations, and mappel::Estimator< Model >::model.

8.45.5.24 template<class Model > double mappel::IterativeMaximizer< Model >::mean_backtracks ( ) [inherited]

8.45.5.25 template<class Model > double mappel::IterativeMaximizer< Model >::mean_der_evals ( ) [inherited]

8.45.5.26 template<class Model > double mappel::IterativeMaximizer< Model >::mean_fun_evals ( ) [inherited]

8.45.5.27 template<class Model > double mappel::IterativeMaximizer< Model >::mean_iterations ( ) [inherited]

8.45.5.28 template<class Model > std::string mappel::QuasiNewtonMaximizer< Model >::name ( ) const [inline], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 357 of file estimator.h.

8.45.5.29 template<class Model > void mappel::IterativeMaximizer< Model >::record_run_statistics (const MaximizerData & *data*) [protected], [inherited]

Definition at line 517 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::exit_code, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::MaximizerData::get_backtrack_idxs(), mappel::IterativeMaximizer< Model >::last_backtrack_idxs, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::MaximizerData::nBacktracks, mappel::IterativeMaximizer< Model >::MaximizerData::nIterations, mappel::IterativeMaximizer< Model >::MaximizerData::save_seq, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::IterativeMaximizer< Model >::total_iterations.

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::compute_profile_estimate().

8.45.5.30 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.45.5.31 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.45.6 Member Data Documentation

8.45.6.1 template<class Model > double mappel::IterativeMaximizer< Model >::alpha = 1e-4 [protected], [inherited]

Definition at line 232 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), and mappel::TrustRegionMaximizer< Model >::bound_step().

8.45.6.2 template<class Model > double mappel::IterativeMaximizer< Model >::delta = sqrt(std::numeric_limits<double>::epsilon()) [protected], [inherited]

Definition at line 229 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.45.6.3 template<class Model > double mappel::IterativeMaximizer< Model >::epsilon = sqrt(std::numeric_limits<double>::epsilon()) [protected], [inherited]

Definition at line 228 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton().

8.45.6.4 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::exit_counts [protected], [inherited]

Definition at line 240 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.45.6.5 template<class Model > double mappel::IterativeMaximizer< Model >::lambda_min = 0.05 [protected], [inherited]

Definition at line 231 of file estimator.h.

Referenced by mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.45.6.6 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::last_backtrack_idxs [protected], [inherited]

Definition at line 242 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.45.6.7 template<class Model > int mappel::IterativeMaximizer< Model >::max_backtracks = 8 [protected], [inherited]

Definition at line 233 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::get_stats().

8.45.6.8 template<class Model > int mappel::IterativeMaximizer< Model >::max_iterations [protected], [inherited]

Definition at line 225 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.45.6.9 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected], [inherited]

Definition at line 127 of file estimator.h.

8.45.6.10 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.45.6.11 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected], [inherited]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.45.6.12 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.45.6.13 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected], [inherited]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.45.6.14 template<class Model > constexpr int mappel::IterativeMaximizer< Model >::NumExitCodes = 7 [static], [inherited]

Definition at line 197 of file estimator.h.

8.45.6.15 template<class Model > int mappel::IterativeMaximizer< Model >::total_backtracks = 0 [protected], [inherited]

Definition at line 237 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.45.6.16 template<class Model > int mappel::IterativeMaximizer< Model >::total_der_evals = 0 [protected], [inherited]

Definition at line 239 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.45.6.17 template<class Model > int mappel::IterativeMaximizer< Model >::total_fun_evals = 0 [protected], [inherited]

Definition at line 238 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.45.6.18 template<class Model > int mappel::IterativeMaximizer< Model >::total_iterations = 0 [protected], [inherited]

Definition at line 236 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.45.6.19 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

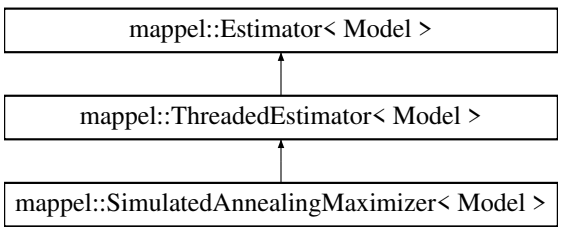
The documentation for this class was generated from the following files:

- estimator.h
- estimator_impl.h

8.46 mappel::SimulatedAnnealingMaximizer< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::SimulatedAnnealingMaximizer< Model >:



Public Member Functions

- std::string name () const
- SimulatedAnnealingMaximizer (Model &model)
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩ stack, VecT &rllh_stack, CubeT &obsI_stack)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_↩ parameters)
- StatsT get_stats ()
- StatsT get_debug_stats ()
- void clear_stats ()
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)

Public Attributes

- double T_init =100.
- double cooling_rate =1.02
- int max_iterations =500

Protected Member Functions

- StencilT< Model > compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- StencilT< Model > anneal (const ModelDataT< Model > &im, const StencilT< Model > &theta_init, double &rllh, MatT &sequence, VecT &sequence_rllh)
- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- virtual void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.46.1 Detailed Description

template<class Model>
class mappel::SimulatedAnnealingMaximizer< Model >

Definition at line 176 of file estimator.h.

8.46.2 Constructor & Destructor Documentation

8.46.2.1 template<class Model > mappel::SimulatedAnnealingMaximizer< Model >::SimulatedAnnealingMaximizer (Model & *model*) [inline]

Definition at line 183 of file estimator.h.

References mappel::Estimator< Model >::compute_estimate(), mappel::Estimator< Model >::compute_estimate_debug(), and mappel::methods::objective::rllh().

8.46.3 Member Function Documentation

8.46.3.1 template<class Model > StencilT< Model > mappel::SimulatedAnnealingMaximizer< Model >::anneal (const ModelDataT< Model > & *im,* const StencilT< Model > & *theta_init,* double & *rllh,* MatT & *sequence,* VecT & *sequence_rllh*) [protected]

Definition at line 1354 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::local_maximize(), mappel::IterativeMaximizer< Model >::max_iterations, mappel::Estimator< Model >::model, and mappel::methods::objective::rllh().

8.46.3.2 template<class Model > void mappel::ThreadedEstimator< Model >::clear_stats ( ) [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 287 of file estimator_impl.h.

References mappel::cgauss_heuristic_compute_estimate(), mappel::Estimator< Model >::clear_stats(), mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, and mappel::methods::objective::rllh().

Referenced by mappel::IterativeMaximizer< Model >::clear_stats().

8.46.3.3 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamT< Model > & *theta_est*, double & *rllh*, MatT & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.46.3.4 template<class Model > StencilT< Model > mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, double & *rllh*) [protected], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 1335 of file estimator_impl.h.

References mappel::Estimator< Model >::model, and mappel::IterativeMaximizer< Model >::MaximizerData::rllh.

8.46.3.5 template<class Model > StencilT< Model > mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, ParamVecT< Model > & *sequence*, VecT & *sequence_rllh*) [protected], [virtual]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented from mappel::Estimator< Model >.

Definition at line 1344 of file estimator_impl.h.

References mappel::Estimator< Model >::model, and mappel::IterativeMaximizer< Model >::MaximizerData::rllh.

8.46.3.6 template<class Model > void mappel::Estimator< Model >::compute_profile_estimate (const ModelDataT< Model > & *im*, const ParamT< Model > & *theta_init*, const IdxVecT & *fixed_parameters*, ParamT< Model > & *theta_est*, double & *rllh*) [protected], [virtual], [inherited]

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 151 of file estimator_impl.h.

References mappel::Estimator< Model >::name().

Referenced by mappel::Estimator< Model >::~Estimator().

8.46.3.7 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.46.3.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.46.3.9 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.46.3.10 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.46.3.11 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.46.3.12 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.46.3.13 template<class Model > void mappel::Estimator< Model >::estimate_max_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI,* MatT & *sequence,* VecT & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.46.3.14 template<class Model > void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack,* ParamVecT< Model > & *theta_est_stack,* VecT & *rllh_stack,* CubeT & *obsI_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.46.3.15 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im,* const ParamVecT< Model > & *theta_init,* ParamVecT< Model > & *theta,* VecT & *rllh,* CubeT & *obsl*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.46.3.16 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_profile_stack (const ModelDataT< Model > & *data,* const IdxVecT & *fixed_parameters,* const MatT & *values,* const ParamVecT< Model > & *theta_init,* VecT & *profile_likelihood,* ParamVecT< Model > & *profile_parameters*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.46.3.17 template<class Model > StatsT mappel::ThreadedEstimator< Model >::get_debug_stats ( ) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 281 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::get_stats().

8.46.3.18 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.46.3.19 template<class Model > StatsT mappel::ThreadedEstimator< Model >::get_stats ( ) [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 271 of file estimator_impl.h.

References mappel::Estimator< Model >::get_stats(), mappel::Estimator< Model >::num_estimations, mappel::ThreadedEstimator< Model >::num_threads, and mappel::Estimator< Model >::total_walltime.

Referenced by mappel::ThreadedEstimator< Model >::get_debug_stats(), mappel::CGaussMLE< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.46.3.20 template<class Model > std::string mappel::SimulatedAnnealingMaximizer< Model >::name ( ) const [inline], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 182 of file estimator.h.

8.46.3.21 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.46.3.22 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.46.4 Member Data Documentation

8.46.4.1 template<class Model > double mappel::SimulatedAnnealingMaximizer< Model >::cooling_rate =1.02

Definition at line 179 of file estimator.h.

8.46.4.2 template<class Model > int mappel::SimulatedAnnealingMaximizer< Model >::max_iterations =500

Definition at line 180 of file estimator.h.

8.46.4.3 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected], [inherited]

Definition at line 127 of file estimator.h.

8.46.4.4 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.46.4.5 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected], [inherited]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.46.4.6 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.46.4.7 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected], [inherited]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.46.4.8 template<class Model > double mappel::SimulatedAnnealingMaximizer< Model >::T_init =100.

Definition at line 178 of file estimator.h.

8.46.4.9 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

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

- estimator.h
- estimator_impl.h

8.47 mappel::Gauss1DModel::Stencil Class Reference

Stencil for 1D fixed-sigma models.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss1DModel.h>`

Public Types

- using ParamT = Gauss1DModel::ParamT

Public Member Functions

- Stencil ()
- Stencil (const Gauss1DModel &model, const ParamT &theta, bool compute_derivatives=true)
- void compute_derivatives ()
- double x () const
- double I () const
- double bg () const

Public Attributes

- bool derivatives_computed = false
- Gauss1DModel const * model
- ParamT theta
- VecT dx
- VecT Gx
- VecT X
- VecT DX
- VecT DXS

Friends

- std::ostream & operator<< (std::ostream &out, const Gauss1DModel::Stencil &s)

8.47.1 Detailed Description

Stencil for 1D fixed-sigma models.

Definition at line 29 of file Gauss1DModel.h.

8.47.2 Member Typedef Documentation

8.47.2.1 using mappel::Gauss1DModel::Stencil::ParamT = Gauss1DModel::ParamT

Definition at line 32 of file Gauss1DModel.h.

8.47.3 Constructor & Destructor Documentation

8.47.3.1 mappel::Gauss1DModel::Stencil::Stencil ( ) [inline]

Definition at line 41 of file Gauss1DModel.h.

References compute_derivatives().

Referenced by mappel::Gauss1DModel::make_stencil().

8.47.3.2 mappel::Gauss1DModel::Stencil::Stencil (const **Gauss1DModel** & *model,* const **ParamT** & *theta,* bool *compute_derivatives* = true)

Definition at line 142 of file Gauss1DModel.cpp.

References compute_derivatives(), dx, mappel::make_d_stencil(), mappel::make_X_stencil(), model, mappel::↩ Gauss1DModel::psf_sigma, mappel::ImageFormat1DBase::size, X, and x().

8.47.4 Member Function Documentation

8.47.4.1 double mappel::Gauss1DModel::Stencil::bg ( ) const [inline]

Definition at line 46 of file Gauss1DModel.h.

References operator<<, and theta.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), and mappel::Gauss1DModel::pixel_model_value().

8.47.4.2 void mappel::Gauss1DModel::Stencil::compute_derivatives ( )

Definition at line 153 of file Gauss1DModel.cpp.

References derivatives_computed, dx, DX, DXS, Gx, mappel::make_DX_stencil(), mappel::make_DXS_stencil(), mappel::make_G_stencil(), model, mappel::Gauss1DModel::psf_sigma, and mappel::ImageFormat1DBase::size.

Referenced by Stencil().

8.47.4.3 double mappel::Gauss1DModel::Stencil::I ( ) const [inline]

Definition at line 45 of file Gauss1DModel.h.

References theta.

Referenced by mappel::Gauss1DModel::initial_theta_estimate(), mappel::Gauss1DModel::pixel_grad(), mappel::↩ Gauss1DModel::pixel_grad2(), mappel::Gauss1DModel::pixel_hess(), mappel::Gauss1DModel::pixel_hess_update(), and mappel::Gauss1DModel::pixel_model_value().

8.47.4.4 double mappel::Gauss1DModel::Stencil::x ( ) const [inline]

Definition at line 44 of file Gauss1DModel.h.

References theta.

Referenced by Stencil().

8.47.5 Friends And Related Function Documentation

8.47.5.1 std::ostream& operator<< (std::ostream & *out,* const Gauss1DModel::Stencil & *s*) [friend]

Definition at line 164 of file Gauss1DModel.cpp.

Referenced by bg().

8.47.6 Member Data Documentation

8.47.6.1 bool mappel::Gauss1DModel::Stencil::derivatives_computed = false

Definition at line 31 of file Gauss1DModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.47.6.2 VecT mappel::Gauss1DModel::Stencil::dx

Definition at line 36 of file Gauss1DModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), and Stencil().

8.47.6.3 VecT mappel::Gauss1DModel::Stencil::DX

Definition at line 39 of file Gauss1DModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss1DModel::pixel_grad(), and mappel::↩ Gauss1DModel::pixel_hess().

8.47.6.4 VecT mappel::Gauss1DModel::Stencil::DXS

Definition at line 40 of file Gauss1DModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss1DModel::pixel_grad2(), mappel::↩ Gauss1DModel::pixel_hess(), and mappel::Gauss1DModel::pixel_hess_update().

8.47.6.5 VecT mappel::Gauss1DModel::Stencil::Gx

Definition at line 37 of file Gauss1DModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.47.6.6 Gauss1DModel const* mappel::Gauss1DModel::Stencil::model

Definition at line 33 of file Gauss1DModel.h.

Referenced by compute_derivatives(), and Stencil().

8.47.6.7 ParamT mappel::Gauss1DModel::Stencil::theta

Definition at line 35 of file Gauss1DModel.h.

Referenced by bg(), I(), mappel::Gauss1DModel::initial_theta_estimate(), mappel::operator<<(), and x().

8.47.6.8 VecT mappel::Gauss1DModel::Stencil::X

Definition at line 38 of file Gauss1DModel.h.

Referenced by mappel::operator<<(), mappel::Gauss1DModel::pixel_grad(), mappel::Gauss1DModel::pixel_model_↩value(), and Stencil().

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

- Gauss1DModel.h
- Gauss1DModel.cpp

8.48 mappel::Gauss1DsModel::Stencil Class Reference

Stencil for 1D variable-sigma models.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss1DsModel.h>`

Public Types

- using ParamT = Gauss1DsModel::ParamT

Public Member Functions

- Stencil ()
- Stencil (const Gauss1DsModel &model, const ParamT &theta, bool _compute_derivatives=true)
- void compute_derivatives ()
- double x () const
- double I () const
- double bg () const
- double sigma () const

Public Attributes

- bool derivatives_computed = false
- Gauss1DsModel const * model
- ParamT theta
- VecT dx
- VecT Gx
- VecT X
- VecT DX
- VecT DXS
- VecT DXS2
- VecT DXSX

Friends

- std::ostream & operator<< (std::ostream &out, const Gauss1DsModel::Stencil &s)

8.48.1 Detailed Description

Stencil for 1D variable-sigma models.

Definition at line 24 of file Gauss1DsModel.h.

8.48.2 Member Typedef Documentation

8.48.2.1 using mappel::Gauss1DsModel::Stencil::ParamT = Gauss1DsModel::ParamT

Definition at line 27 of file Gauss1DsModel.h.

8.48.3 Constructor & Destructor Documentation

8.48.3.1 mappel::Gauss1DsModel::Stencil::Stencil ( ) [inline]

Definition at line 38 of file Gauss1DsModel.h.

References compute_derivatives().

Referenced by mappel::Gauss1DsModel::make_stencil().

8.48.3.2 mappel::Gauss1DsModel::Stencil::Stencil (const Gauss1DsModel & *model,* const ParamT & *theta,* bool *_compute_derivatives* = true)

Definition at line 159 of file Gauss1DsModel.cpp.

References compute_derivatives(), dx, mappel::make_d_stencil(), mappel::make_X_stencil(), model, sigma(), mappel::ImageFormat1DBase::size, X, and x().

8.48.4 Member Function Documentation

8.48.4.1 double mappel::Gauss1DsModel::Stencil::bg ( ) const [inline]

Definition at line 43 of file Gauss1DsModel.h.

References theta.

Referenced by mappel::Gauss1DsModel::initial_theta_estimate(), and mappel::Gauss1DsModel::pixel_model_value().

8.48.4.2 void mappel::Gauss1DsModel::Stencil::compute_derivatives ( )

Definition at line 170 of file Gauss1DsModel.cpp.

References derivatives_computed, dx, DX, DXS, DXS2, DXSX, Gx, mappel::make_DX_stencil(), mappel::make_DX↩S2_stencil(), mappel::make_DXS_stencil(), mappel::make_DXSX_stencil(), mappel::make_G_stencil(), model, sigma(), and mappel::ImageFormat1DBase::size.

Referenced by Stencil().

8.48.4.3 double mappel::Gauss1DsModel::Stencil::I ( ) const [inline]

Definition at line 42 of file Gauss1DsModel.h.

References theta.

Referenced by mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss1DsModel::pixel_grad(), mappel↩::Gauss1DsModel::pixel_grad2(), mappel::Gauss1DsModel::pixel_hess(), mappel::Gauss1DsModel::pixel_hess_↩update(), and mappel::Gauss1DsModel::pixel_model_value().

8.48.4.4 double mappel::Gauss1DsModel::Stencil::sigma ( ) const [inline]

Definition at line 44 of file Gauss1DsModel.h.

References operator<<, and theta.

Referenced by compute_derivatives(), mappel::Gauss1DsModel::initial_theta_estimate(), mappel::Gauss1DsModel↩::pixel_grad2(), mappel::Gauss1DsModel::pixel_hess(), mappel::Gauss1DsModel::pixel_hess_update(), and Stencil().

8.48.4.5 double mappel::Gauss1DsModel::Stencil::x ( ) const [inline]

Definition at line 41 of file Gauss1DsModel.h.

References theta.

Referenced by Stencil().

8.48.5 Friends And Related Function Documentation

8.48.5.1 std::ostream& operator<< (std::ostream & *out,* const Gauss1DsModel::Stencil & *s*) [friend]

Definition at line 182 of file Gauss1DsModel.cpp.

Referenced by sigma().

8.48.6 Member Data Documentation

8.48.6.1 bool mappel::Gauss1DsModel::Stencil::derivatives_computed = false

Definition at line 26 of file Gauss1DsModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.48.6.2 VecT mappel::Gauss1DsModel::Stencil::dx

Definition at line 31 of file Gauss1DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), and Stencil().

8.48.6.3 VecT mappel::Gauss1DsModel::Stencil::DX

Definition at line 34 of file Gauss1DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss1DsModel::pixel_grad(), mappel::Gauss1DsModel::pixel_hess(), and mappel::Gauss1DsModel::pixel_hess_update().

8.48.6.4 VecT mappel::Gauss1DsModel::Stencil::DXS

Definition at line 35 of file Gauss1DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss1DsModel::pixel_grad(), mappel::Gauss1DsModel::pixel_grad2(), mappel::Gauss1DsModel::pixel_hess(), and mappel::Gauss1DsModel::pixel_hess_update().

8.48.6.5 VecT mappel::Gauss1DsModel::Stencil::DXS2

Definition at line 36 of file Gauss1DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss1DsModel::pixel_grad2(), mappel::Gauss1DsModel::pixel_hess(), and mappel::Gauss1DsModel::pixel_hess_update().

8.48.6.6 VecT mappel::Gauss1DsModel::Stencil::DXSX

Definition at line 37 of file Gauss1DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss1DsModel::pixel_hess(), and mappel::Gauss1DsModel::pixel_hess_update().

8.48.6.7 VecT mappel::Gauss1DsModel::Stencil::Gx

Definition at line 32 of file Gauss1DsModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.48.6.8 Gauss1DsModel const* mappel::Gauss1DsModel::Stencil::model

Definition at line 28 of file Gauss1DsModel.h.

Referenced by compute_derivatives(), and Stencil().

8.48.6.9 ParamT mappel::Gauss1DsModel::Stencil::theta

Definition at line 30 of file Gauss1DsModel.h.

Referenced by bg(), I(), mappel::operator<<(), sigma(), and x().

8.48.6.10 VecT mappel::Gauss1DsModel::Stencil::X

Definition at line 33 of file Gauss1DsModel.h.

Referenced by mappel::operator<<(), mappel::Gauss1DsModel::pixel_grad(), mappel::Gauss1DsModel::pixel_↩ model_value(), and Stencil().

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

- Gauss1DsModel.h
- Gauss1DsModel.cpp

8.49 mappel::Gauss2DsxyModel::Stencil Class Reference

Stencil for 2D free-sigma (astigmatic) models.

```
#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DsxyModel.↩
h>
```

Public Types

- typedef Gauss2DsxyModel::ParamT ParamT

Public Member Functions

- Stencil ()
- Stencil (const Gauss2DsxyModel &model, const ParamT &theta, bool _compute_derivatives=true)
- void compute_derivatives ()
- double x () const
- double y () const
- double I () const
- double bg () const
- double sigmaX () const
- double sigmaY () const

Public Attributes

- bool derivatives_computed =false
- Gauss2DsxyModel const * model
- ParamT theta
- VecT dx
- VecT dy
- VecT Gx
- VecT Gy
- VecT X
- VecT Y
- VecT DX
- VecT DY
- VecT DXSX
- VecT DYSX
- VecT DXS
- VecT DYS
- VecT DXS2
- VecT DYS2
- VecT DYSY

Friends

- std::ostream & operator<< (std::ostream &out, const Gauss2DsxyModel::Stencil &s)

8.49.1 Detailed Description

Stencil for 2D free-sigma (astigmatic) models.

Definition at line 32 of file Gauss2DsxyModel.h.

8.49.2 Member Typedef Documentation

8.49.2.1 typedef Gauss2DsxyModel::ParamT mappel::Gauss2DsxyModel::Stencil::ParamT

Definition at line 35 of file Gauss2DsxyModel.h.

8.49.3 Constructor & Destructor Documentation

8.49.3.1 mappel::Gauss2DsxyModel::Stencil::Stencil ( ) [inline]

Definition at line 47 of file Gauss2DsxyModel.h.

References compute_derivatives().

Referenced by mappel::Gauss2DsxyModel::make_stencil().

8.49.3.2 mappel::Gauss2DsxyModel::Stencil::Stencil (const **Gauss2DsxyModel** & *model,* const **ParamT** & *theta,* bool *_compute_derivatives* = `true`)

8.49.4 Member Function Documentation

8.49.4.1 double mappel::Gauss2DsxyModel::Stencil::bg ( ) const [inline]

Definition at line 53 of file Gauss2DsxyModel.h.

References theta.

Referenced by mappel::Gauss2DsxyModel::pixel_model_value().

8.49.4.2 void mappel::Gauss2DsxyModel::Stencil::compute_derivatives ( )

Referenced by Stencil().

8.49.4.3 double mappel::Gauss2DsxyModel::Stencil::I ( ) const [inline]

Definition at line 52 of file Gauss2DsxyModel.h.

References theta.

Referenced by mappel::Gauss2DsxyModel::pixel_grad(), mappel::Gauss2DsxyModel::pixel_grad2(), mappel::↩ Gauss2DsxyModel::pixel_hess(), and mappel::Gauss2DsxyModel::pixel_model_value().

8.49.4.4 double mappel::Gauss2DsxyModel::Stencil::sigmaX ( ) const [inline]

Definition at line 54 of file Gauss2DsxyModel.h.

References theta.

Referenced by mappel::Gauss2DsxyModel::pixel_grad2(), and mappel::Gauss2DsxyModel::pixel_hess().

8.49.4.5 double mappel::Gauss2DsxyModel::Stencil::sigmaY ( ) const [inline]

Definition at line 55 of file Gauss2DsxyModel.h.

References operator<<, and theta.

Referenced by mappel::Gauss2DsxyModel::pixel_grad2(), and mappel::Gauss2DsxyModel::pixel_hess().

8.49.4.6 double mappel::Gauss2DsxyModel::Stencil::x ( ) const [inline]

Definition at line 50 of file Gauss2DsxyModel.h.

References theta.

8.49.4.7 double mappel::Gauss2DsxyModel::Stencil::y ( ) const [inline]

Definition at line 51 of file Gauss2DsxyModel.h.

References theta.

8.49.5 Friends And Related Function Documentation

8.49.5.1 std::ostream& operator<< (std::ostream & *out,* const **Gauss2DsxyModel::Stencil** & *s*) [friend]

Referenced by sigmaY().

8.49.6 Member Data Documentation

8.49.6.1 bool mappel::Gauss2DsxyModel::Stencil::derivatives_computed =false

Definition at line 34 of file Gauss2DsxyModel.h.

8.49.6.2 VecT mappel::Gauss2DsxyModel::Stencil::dx

Definition at line 39 of file Gauss2DsxyModel.h.

8.49.6.3 VecT mappel::Gauss2DsxyModel::Stencil::DX

Definition at line 42 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_grad(), and mappel::Gauss2DsxyModel::pixel_hess().

8.49.6.4 VecT mappel::Gauss2DsxyModel::Stencil::DXS

Definition at line 44 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_grad(), mappel::Gauss2DsxyModel::pixel_grad2(), and mappel::↩ Gauss2DsxyModel::pixel_hess().

8.49.6.5 VecT mappel::Gauss2DsxyModel::Stencil::DXS2

Definition at line 45 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_grad2(), and mappel::Gauss2DsxyModel::pixel_hess().

8.49.6.6 VecT mappel::Gauss2DsxyModel::Stencil::DXSX

Definition at line 43 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_hess().

8.49.6.7 VecT mappel::Gauss2DsxyModel::Stencil::dy

Definition at line 39 of file Gauss2DsxyModel.h.

8.49.6.8 VecT mappel::Gauss2DsxyModel::Stencil::DY

Definition at line 42 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_grad(), and mappel::Gauss2DsxyModel::pixel_hess().

8.49.6.9 VecT mappel::Gauss2DsxyModel::Stencil::DYS

Definition at line 44 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_grad(), mappel::Gauss2DsxyModel::pixel_grad2(), and mappel::↩ Gauss2DsxyModel::pixel_hess().

8.49.6.10 VecT mappel::Gauss2DsxyModel::Stencil::DYS2

Definition at line 45 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_grad2(), and mappel::Gauss2DsxyModel::pixel_hess().

8.49.6.11 VecT mappel::Gauss2DsxyModel::Stencil::DYSX

Definition at line 43 of file Gauss2DsxyModel.h.

8.49.6.12 VecT mappel::Gauss2DsxyModel::Stencil::DYSY

Definition at line 46 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_hess().

8.49.6.13 VecT mappel::Gauss2DsxyModel::Stencil::Gx

Definition at line 40 of file Gauss2DsxyModel.h.

8.49.6.14 VecT mappel::Gauss2DsxyModel::Stencil::Gy

Definition at line 40 of file Gauss2DsxyModel.h.

8.49.6.15 Gauss2DsxyModel const* mappel::Gauss2DsxyModel::Stencil::model

Definition at line 36 of file Gauss2DsxyModel.h.

8.49.6.16 ParamT mappel::Gauss2DsxyModel::Stencil::theta

Definition at line 38 of file Gauss2DsxyModel.h.

Referenced by bg(), I(), sigmaX(), sigmaY(), x(), and y().

8.49.6.17 VecT mappel::Gauss2DsxyModel::Stencil::X

Definition at line 41 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_grad(), mappel::Gauss2DsxyModel::pixel_grad2(), mappel::↩ Gauss2DsxyModel::pixel_hess(), and mappel::Gauss2DsxyModel::pixel_model_value().

8.49.6.18 VecT mappel::Gauss2DsxyModel::Stencil::Y

Definition at line 41 of file Gauss2DsxyModel.h.

Referenced by mappel::Gauss2DsxyModel::pixel_grad(), mappel::Gauss2DsxyModel::pixel_grad2(), mappel::↩ Gauss2DsxyModel::pixel_hess(), and mappel::Gauss2DsxyModel::pixel_model_value().

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

- Gauss2DsxyModel.h

8.50 mappel::Gauss2DsModel::Stencil Class Reference

Stencil for 2D scalar-sigma models.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DsModel.h>`

Public Types

- typedef Gauss2DsModel::ParamT ParamT

Public Member Functions

- Stencil ()
- Stencil (const Gauss2DsModel &model, const ParamT &theta, bool _compute_derivatives=true)
- void compute_derivatives ()
- double x () const
- double y () const
- double I () const
- double bg () const
- double sigma_ratio () const
- double sigmaX () const
- double sigmaY () const

Public Attributes

- bool derivatives_computed =false
- Gauss2DsModel const * model
- ParamT theta
- VecT dx
- VecT dy
- VecT Gx
- VecT Gy
- VecT X
- VecT Y
- VecT DX
- VecT DY
- VecT DXS
- VecT DYS
- VecT DXS2
- VecT DYS2
- VecT DXSX
- VecT DYSY

Friends

- std::ostream & operator<< (std::ostream &out, const Gauss2DsModel::Stencil &s)

8.50.1 Detailed Description

Stencil for 2D scalar-sigma models.

Definition at line 29 of file Gauss2DsModel.h.

8.50.2 Member Typedef Documentation

8.50.2.1 typedef Gauss2DsModel::ParamT mappel::Gauss2DsModel::Stencil::ParamT

Definition at line 32 of file Gauss2DsModel.h.

8.50.3 Constructor & Destructor Documentation

8.50.3.1 mappel::Gauss2DsModel::Stencil::Stencil ( ) [inline]

Definition at line 43 of file Gauss2DsModel.h.

References compute_derivatives().

Referenced by mappel::Gauss2DsModel::make_stencil().

8.50.3.2 mappel::Gauss2DsModel::Stencil::Stencil (const Gauss2DsModel & *model,* const ParamT & *theta,* bool *_compute_derivatives* = `true`)

Definition at line 286 of file Gauss2DsModel.cpp.

References compute_derivatives(), dx, dy, mappel::make_d_stencil(), mappel::make_X_stencil(), model, sigmaX(), sigmaY(), mappel::ImageFormat2DBase::size, X, x(), Y, and y().

8.50.4 Member Function Documentation

8.50.4.1 double mappel::Gauss2DsModel::Stencil::bg ( ) const [inline]

Definition at line 49 of file Gauss2DsModel.h.

References theta.

Referenced by mappel::Gauss2DsModel::initial_theta_estimate(), and mappel::Gauss2DsModel::pixel_model_value().

8.50.4.2 void mappel::Gauss2DsModel::Stencil::compute_derivatives ( )

Definition at line 300 of file Gauss2DsModel.cpp.

References derivatives_computed, dx, DX, DXS, DXS2, DXSX, dy, DY, DYS, DYS2, DYSY, Gx, Gy, mappel::make_DX_stencil(), mappel::make_DXS2_stencil(), mappel::make_DXS_stencil(), mappel::make_DXSX_stencil(), mappel::make_G_stencil(), model, sigmaX(), sigmaY(), and mappel::ImageFormat2DBase::size.

Referenced by Stencil().

8.50.4.3 double mappel::Gauss2DsModel::Stencil::I ( ) const [inline]

Definition at line 48 of file Gauss2DsModel.h.

References theta.

Referenced by mappel::Gauss2DsModel::initial_theta_estimate(), mappel::Gauss2DsModel::pixel_grad(), mappel::Gauss2DsModel::pixel_grad2(), mappel::Gauss2DsModel::pixel_hess(), mappel::Gauss2DsModel::pixel_hess_update(), and mappel::Gauss2DsModel::pixel_model_value().

8.50.4.4 double mappel::Gauss2DsModel::Stencil::sigma_ratio ( ) const [inline]

Definition at line 50 of file Gauss2DsModel.h.

References theta.

Referenced by mappel::Gauss2DsModel::initial_theta_estimate(), sigmaX(), and sigmaY().

8.50.4.5 double mappel::Gauss2DsModel::Stencil::sigmaX ( ) const [inline]

Definition at line 51 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::min_sigma, and sigma_ratio().

Referenced by compute_derivatives(), mappel::Gauss2DsModel::pixel_grad2(), mappel::Gauss2DsModel::pixel_hess(), mappel::Gauss2DsModel::pixel_hess_update(), and Stencil().

8.50.4.6 double mappel::Gauss2DsModel::Stencil::sigmaY ( ) const [inline]

Definition at line 52 of file Gauss2DsModel.h.

References mappel::Gauss2DsModel::min_sigma, operator<<, and sigma_ratio().

Referenced by compute_derivatives(), mappel::Gauss2DsModel::pixel_grad2(), mappel::Gauss2DsModel::pixel_hess(), mappel::Gauss2DsModel::pixel_hess_update(), and Stencil().

8.50.4.7 double mappel::Gauss2DsModel::Stencil::x ( ) const [inline]

Definition at line 46 of file Gauss2DsModel.h.

References theta.

Referenced by Stencil().

8.50.4.8 double mappel::Gauss2DsModel::Stencil::y ( ) const [inline]

Definition at line 47 of file Gauss2DsModel.h.

References theta.

Referenced by Stencil().

8.50.5 Friends And Related Function Documentation

8.50.5.1 std::ostream& operator<< (std::ostream & *out,* const **Gauss2DsModel::Stencil** & *s*) [friend]

Definition at line 318 of file Gauss2DsModel.cpp.

Referenced by sigmaY().

8.50.6 Member Data Documentation

8.50.6.1 bool mappel::Gauss2DsModel::Stencil::derivatives_computed =false

Definition at line 31 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.50.6.2 VecT mappel::Gauss2DsModel::Stencil::dx

Definition at line 36 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), and Stencil().

8.50.6.3 VecT mappel::Gauss2DsModel::Stencil::DX

Definition at line 39 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DsModel::pixel_grad(), mappel::↩ Gauss2DsModel::pixel_hess(), and mappel::Gauss2DsModel::pixel_hess_update().

8.50.6.4 VecT mappel::Gauss2DsModel::Stencil::DXS

Definition at line 40 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DsModel::pixel_grad(), mappel::↩ Gauss2DsModel::pixel_grad2(), mappel::Gauss2DsModel::pixel_hess(), and mappel::Gauss2DsModel::pixel_hess_↩ update().

8.50.6.5 VecT mappel::Gauss2DsModel::Stencil::DXS2

Definition at line 41 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DsModel::pixel_grad2(), mappel::↩ Gauss2DsModel::pixel_hess(), and mappel::Gauss2DsModel::pixel_hess_update().

8.50.6.6 VecT mappel::Gauss2DsModel::Stencil::DXSX

Definition at line 42 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DsModel::pixel_hess(), and mappel::↩ Gauss2DsModel::pixel_hess_update().

8.50.6.7 VecT mappel::Gauss2DsModel::Stencil::dy

Definition at line 36 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), and Stencil().

8.50.6.8 VecT mappel::Gauss2DsModel::Stencil::DY

Definition at line 39 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DsModel::pixel_grad(), mappel::↩ Gauss2DsModel::pixel_hess(), and mappel::Gauss2DsModel::pixel_hess_update().

8.50.6.9 VecT mappel::Gauss2DsModel::Stencil::DYS

Definition at line 40 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DsModel::pixel_grad(), mappel::↩ Gauss2DsModel::pixel_grad2(), mappel::Gauss2DsModel::pixel_hess(), and mappel::Gauss2DsModel::pixel_hess_↩ update().

8.50.6.10 VecT mappel::Gauss2DsModel::Stencil::DYS2

Definition at line 41 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DsModel::pixel_grad2(), mappel::↩ Gauss2DsModel::pixel_hess(), and mappel::Gauss2DsModel::pixel_hess_update().

8.50.6.11 VecT mappel::Gauss2DsModel::Stencil::DYSY

Definition at line 42 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DsModel::pixel_hess(), and mappel::↩ Gauss2DsModel::pixel_hess_update().

8.50.6.12 VecT mappel::Gauss2DsModel::Stencil::Gx

Definition at line 37 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.50.6.13 VecT mappel::Gauss2DsModel::Stencil::Gy

Definition at line 37 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.50.6.14 Gauss2DsModel const* mappel::Gauss2DsModel::Stencil::model

Definition at line 33 of file Gauss2DsModel.h.

Referenced by compute_derivatives(), and Stencil().

8.50.6.15 ParamT mappel::Gauss2DsModel::Stencil::theta

Definition at line 35 of file Gauss2DsModel.h.

Referenced by bg(), I(), mappel::operator<<(), sigma_ratio(), x(), and y().

8.50.6.16 VecT mappel::Gauss2DsModel::Stencil::X

Definition at line 38 of file Gauss2DsModel.h.

Referenced by mappel::operator<<(), mappel::Gauss2DsModel::pixel_grad(), mappel::Gauss2DsModel::pixel_grad2(), mappel::Gauss2DsModel::pixel_hess(), mappel::Gauss2DsModel::pixel_hess_update(), mappel::Gauss2DsModel↩ ::pixel_model_value(), and Stencil().

8.50.6.17 VecT mappel::Gauss2DsModel::Stencil::Y

Definition at line 38 of file Gauss2DsModel.h.

Referenced by mappel::operator<<(), mappel::Gauss2DsModel::pixel_grad(), mappel::Gauss2DsModel::pixel_grad2(), mappel::Gauss2DsModel::pixel_hess(), mappel::Gauss2DsModel::pixel_hess_update(), mappel::Gauss2DsModel↩ ::pixel_model_value(), and Stencil().

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

- Gauss2DsModel.h
- Gauss2DsModel.cpp

8.51 mappel::Gauss2DModel::Stencil Class Reference

Stencil for 2D fixed-sigma models.

`#include </home/travis/build/markjolah/Mappel/include/Mappel/Gauss2DModel.h>`

Public Types

- using ParamT = Gauss2DModel::ParamT

Public Member Functions

- Stencil ()
- Stencil (const Gauss2DModel &model, const ParamT &theta, bool compute_derivatives=true)
- void compute_derivatives ()
- double x () const
- double y () const
- double I () const
- double bg () const

Public Attributes

- bool derivatives_computed =false
- Gauss2DModel const * model
- ParamT theta
- VecT dx
- VecT dy
- VecT Gx
- VecT Gy
- VecT X
- VecT Y
- VecT DX
- VecT DY
- VecT DXS
- VecT DYS

Friends

- std::ostream & operator<< (std::ostream &out, const Gauss2DModel::Stencil &s)

8.51.1 Detailed Description

Stencil for 2D fixed-sigma models.

Definition at line 26 of file Gauss2DModel.h.

8.51.2 Member Typedef Documentation

8.51.2.1 using mappel::Gauss2DModel::Stencil::ParamT = Gauss2DModel::ParamT

Definition at line 29 of file Gauss2DModel.h.

8.51.3 Constructor & Destructor Documentation

8.51.3.1 mappel::Gauss2DModel::Stencil::Stencil ( ) [inline]

Definition at line 38 of file Gauss2DModel.h.

References compute_derivatives().

Referenced by mappel::Gauss2DModel::make_stencil().

8.51.3.2 mappel::Gauss2DModel::Stencil::Stencil (const Gauss2DModel & *model,* const ParamT & *theta,* bool *compute_derivatives* = `true`)

Definition at line 218 of file Gauss2DModel.cpp.

References compute_derivatives(), dx, dy, mappel::make_d_stencil(), mappel::make_X_stencil(), model, mappel::↩ Gauss2DModel::psf_sigma, mappel::ImageFormat2DBase::size, X, x(), Y, and y().

8.51.4 Member Function Documentation

8.51.4.1 double mappel::Gauss2DModel::Stencil::bg ( ) const [inline]

Definition at line 44 of file Gauss2DModel.h.

References operator<<, and theta.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), and mappel::Gauss2DModel::pixel_model_value().

8.51.4.2 void mappel::Gauss2DModel::Stencil::compute_derivatives ( )

Definition at line 232 of file Gauss2DModel.cpp.

References derivatives_computed, dx, DX, DXS, dy, DY, DYS, Gx, Gy, mappel::make_DX_stencil(), mappel::make_↩ DXS_stencil(), mappel::make_G_stencil(), model, mappel::Gauss2DModel::psf_sigma, and mappel::ImageFormat2D↩ Base::size.

Referenced by Stencil().

8.51.4.3 double mappel::Gauss2DModel::Stencil::I ( ) const [inline]

Definition at line 43 of file Gauss2DModel.h.

References theta.

Referenced by mappel::Gauss2DModel::initial_theta_estimate(), mappel::Gauss2DModel::pixel_grad(), mappel::↩ Gauss2DModel::pixel_grad2(), mappel::Gauss2DModel::pixel_hess(), mappel::Gauss2DModel::pixel_hess_update(), and mappel::Gauss2DModel::pixel_model_value().

8.51.4.4 double mappel::Gauss2DModel::Stencil::x ( ) const [inline]

Definition at line 41 of file Gauss2DModel.h.

References theta.

Referenced by Stencil().

8.51.4.5 double mappel::Gauss2DModel::Stencil::y ( ) const [inline]

Definition at line 42 of file Gauss2DModel.h.

References theta.

Referenced by Stencil().

8.51.5 Friends And Related Function Documentation

8.51.5.1 std::ostream& operator<< (std::ostream & *out,* const Gauss2DModel::Stencil & *s*) [friend]

Definition at line 249 of file Gauss2DModel.cpp.

Referenced by bg().

8.51.6 Member Data Documentation

8.51.6.1 bool mappel::Gauss2DModel::Stencil::derivatives_computed =false

Definition at line 28 of file Gauss2DModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.51.6.2 VecT mappel::Gauss2DModel::Stencil::dx

Definition at line 33 of file Gauss2DModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), and Stencil().

8.51.6.3 VecT mappel::Gauss2DModel::Stencil::DX

Definition at line 36 of file Gauss2DModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DModel::pixel_grad(), mappel::↩ Gauss2DModel::pixel_hess(), and mappel::Gauss2DModel::pixel_hess_update().

8.51.6.4 VecT mappel::Gauss2DModel::Stencil::DXS

Definition at line 37 of file Gauss2DModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DModel::pixel_grad2(), mappel::↩ Gauss2DModel::pixel_hess(), and mappel::Gauss2DModel::pixel_hess_update().

8.51.6.5 VecT mappel::Gauss2DModel::Stencil::dy

Definition at line 33 of file Gauss2DModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), and Stencil().

8.51.6.6 VecT mappel::Gauss2DModel::Stencil::DY

Definition at line 36 of file Gauss2DModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DModel::pixel_grad(), mappel::↩ Gauss2DModel::pixel_hess(), and mappel::Gauss2DModel::pixel_hess_update().

8.51.6.7 VecT mappel::Gauss2DModel::Stencil::DYS

Definition at line 37 of file Gauss2DModel.h.

Referenced by compute_derivatives(), mappel::operator<<(), mappel::Gauss2DModel::pixel_grad2(), mappel::↩ Gauss2DModel::pixel_hess(), and mappel::Gauss2DModel::pixel_hess_update().

8.51.6.8 VecT mappel::Gauss2DModel::Stencil::Gx

Definition at line 34 of file Gauss2DModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.51.6.9 VecT mappel::Gauss2DModel::Stencil::Gy

Definition at line 34 of file Gauss2DModel.h.

Referenced by compute_derivatives(), and mappel::operator<<().

8.51.6.10 Gauss2DModel const* mappel::Gauss2DModel::Stencil::model

Definition at line 30 of file Gauss2DModel.h.

Referenced by compute_derivatives(), and Stencil().

8.51.6.11 ParamT mappel::Gauss2DModel::Stencil::theta

Definition at line 32 of file Gauss2DModel.h.

Referenced by bg(), I(), mappel::operator<<(), x(), and y().

8.51.6.12 VecT mappel::Gauss2DModel::Stencil::X

Definition at line 35 of file Gauss2DModel.h.

Referenced by mappel::operator<<(), mappel::Gauss2DModel::pixel_grad(), mappel::Gauss2DModel::pixel_grad2(), mappel::Gauss2DModel::pixel_hess(), mappel::Gauss2DModel::pixel_hess_update(), mappel::Gauss2DModel::pixel↩ _model_value(), and Stencil().

8.51.6.13 VecT mappel::Gauss2DModel::Stencil::Y

Definition at line 35 of file Gauss2DModel.h.

Referenced by mappel::operator<<(), mappel::Gauss2DModel::pixel_grad(), mappel::Gauss2DModel::pixel_grad2(), mappel::Gauss2DModel::pixel_hess(), mappel::Gauss2DModel::pixel_hess_update(), mappel::Gauss2DModel::pixel↩_model_value(), and Stencil().

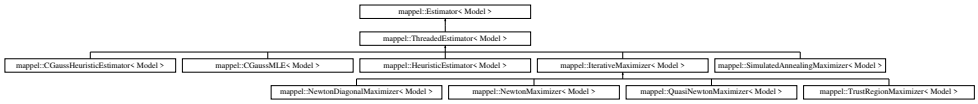
The documentation for this class was generated from the following files:

- Gauss2DModel.h
- Gauss2DModel.cpp

8.52 mappel::ThreadedEstimator< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::ThreadedEstimator< Model >:



Public Member Functions

- ThreadedEstimator (Model &model)
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_↩parameters)
- StatsT get_stats ()
- StatsT get_debug_stats ()
- void clear_stats ()
- virtual std::string name () const =0
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩stack, VecT &rllh_stack, CubeT &obsI_stack)

Protected Member Functions

- virtual StencilT< Model > compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)=0
- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- virtual StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- virtual void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Protected Attributes

- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.52.1 Detailed Description

template<class Model>
class mappel::ThreadedEstimator< Model >

We avoid combining Estimator and ThreadedEstimator classes so that a future GPU implementation can inherit directly from Estimator as it will present a differnt method for estimate_stack pure virtual member function. For now all other (CPU) estimators inherit from ThreadedEstimator.

Definition at line 113 of file estimator.h.

8.52.2 Constructor & Destructor Documentation

8.52.2.1 template<class Model > mappel::ThreadedEstimator< Model >::ThreadedEstimator (Model & *model*)

Definition at line 213 of file estimator_impl.h.

8.52.3 Member Function Documentation

8.52.3.1 template<class Model > void mappel::ThreadedEstimator< Model >::clear_stats ( ) [virtual]

Reimplemented from mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 287 of file estimator_impl.h.

References mappel::cgauss_heuristic_compute_estimate(), mappel::Estimator< Model >::clear_stats(), mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, and mappel::methods::objective::rllh().

Referenced by mappel::IterativeMaximizer< Model >::clear_stats().

8.52.3.2 template<class Model > virtual StencilT<Model> mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [protected], [pure virtual], [inherited]

Implemented in mappel::IterativeMaximizer< Model >, mappel::SimulatedAnnealingMaximizer< Model >, and mappel::CGaussMLE< Model >.

Referenced by mappel::HeuristicEstimator< Model >::name(), mappel::CGaussHeuristicEstimator< Model >::name(), mappel::CGaussMLE< Model >::name(), mappel::SimulatedAnnealingMaximizer< Model >::SimulatedAnnealingMaximizer(), and mappel::Estimator< Model >::~Estimator().

8.52.3.3 template<class Model > void mappel::Estimator< Model >::compute_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.52.3.4 template<class Model > StencilT< Model > mappel::Estimator< Model >::compute_estimate_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamVecT< Model > & *sequence,* VecT & *sequence_rllh*) [inline], [protected], [virtual], [inherited]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented in mappel::IterativeMaximizer< Model >, mappel::SimulatedAnnealingMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 192 of file estimator_impl.h.

Referenced by mappel::CGaussMLE< Model >::name(), mappel::SimulatedAnnealingMaximizer< Model >::SimulatedAnnealingMaximizer(), and mappel::Estimator< Model >::~Estimator().

8.52.3.5 template<class Model > void mappel::Estimator< Model >::compute_profile_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* const IdxVecT & *fixed_parameters,* ParamT< Model > & *theta_est,* double & *rllh*) [protected], [virtual], [inherited]

Reimplemented in mappel::IterativeMaximizer< Model >.

Definition at line 151 of file estimator_impl.h.

References mappel::Estimator< Model >::name().

Referenced by mappel::Estimator< Model >::~Estimator().

8.52.3.6 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.52.3.7 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.52.3.8 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.52.3.9 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.52.3.10 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.52.3.11 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.52.3.12 template<class Model > void mappel::Estimator< Model >::estimate_max_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsl,* MatT & *sequence,* VecT & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.52.3.13 template<class Model > void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack,* ParamVecT< Model > & *theta_est_stack,* VecT & *rllh_stack,* CubeT & *obsl_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.52.3.14 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im,* const ParamVecT< Model > & *theta_init,* ParamVecT< Model > & *theta,* VecT & *rllh,* CubeT & *obsl*) [virtual]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.52.3.15 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_profile_stack (const ModelDataT< Model > & *data,* const IdxVecT & *fixed_parameters,* const MatT & *values,* const ParamVecT< Model > & *theta_init,* VecT & *profile_likelihood,* ParamVecT< Model > & *profile_parameters*) [virtual]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.52.3.16 template<class Model > StatsT mappel::ThreadedEstimator< Model >::get_debug_stats ( ) [virtual]

Implements mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 281 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::get_stats().

8.52.3.17 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.52.3.18 template<class Model > StatsT mappel::ThreadedEstimator< Model >::get_stats ( ) [virtual]

Reimplemented from mappel::Estimator< Model >.

Reimplemented in mappel::IterativeMaximizer< Model >, and mappel::CGaussMLE< Model >.

Definition at line 271 of file estimator_impl.h.

References mappel::Estimator< Model >::get_stats(), mappel::Estimator< Model >::num_estimations, mappel::ThreadedEstimator< Model >::num_threads, and mappel::Estimator< Model >::total_walltime.

Referenced by mappel::ThreadedEstimator< Model >::get_debug_stats(), mappel::CGaussMLE< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.52.3.19 template<class Model > virtual std::string mappel::Estimator< Model >::name ( ) const [pure virtual], [inherited]

Implemented in mappel::TrustRegionMaximizer< Model >, mappel::QuasiNewtonMaximizer< Model >, mappel::NewtonMaximizer< Model >, mappel::NewtonDiagonalMaximizer< Model >, mappel::SimulatedAnnealingMaximizer< Model >, mappel::CGaussMLE< Model >, mappel::CGaussHeuristicEstimator< Model >, and mappel::HeuristicEstimator< Model >.

Referenced by mappel::Estimator< Model >::compute_profile_estimate(), and mappel::Estimator< Model >::~Estimator().

8.52.3.20 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.52.3.21 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.52.4 Member Data Documentation

8.52.4.1 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected]

Definition at line 127 of file estimator.h.

8.52.4.2 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.52.4.3 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.52.4.4 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.52.4.5 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.52.4.6 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

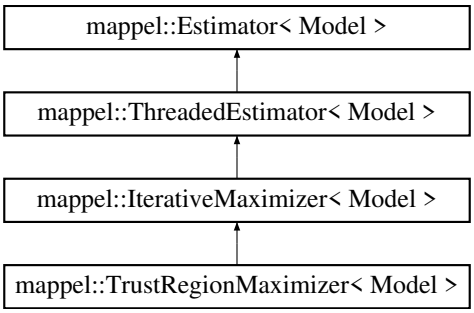
The documentation for this class was generated from the following files:

- estimator.h
- estimator_impl.h

8.53 mappel::TrustRegionMaximizer< Model > Class Template Reference

`#include </home/travis/build/markjolah/Mappel/include/Mappel/estimator.h>`

Inheritance diagram for mappel::TrustRegionMaximizer< Model >:



Public Types

- using MaximizerData = typename IterativeMaximizer< Model >::MaximizerData
- enum ExitCode : IdxT {
  ExitCode::Unassigned = 99, ExitCode::MaxIter = 6, ExitCode::MaxBacktracks = 5, ExitCode::TrustRegionRadius = 4,
  ExitCode::GradRatio = 3, ExitCode::FunctionChange = 2, ExitCode::StepSize = 1, ExitCode::Error = 0 }

Public Member Functions

- TrustRegionMaximizer (Model &model, int max_iterations=DEFAULT_ITERATIONS)
- std::string name () const
- double mean_iterations ()
- double mean_backtracks ()
- double mean_fun_evals ()
- double mean_der_evals ()
- StatsT get_stats ()
- StatsT get_debug_stats ()
- void clear_stats ()
- void local_maximize (const ModelDataT< Model > &im, const StencilT< Model > &theta_init, StencilT< Model > &stencil, double &rllh)

  Perform a local maximization to finish off a simulated annealing run.
- void estimate_max_stack (const ModelDataStackT< Model > &im, const ParamVecT< Model > &theta_init, ParamVecT< Model > &theta, VecT &rllh, CubeT &obsI)
- void estimate_max_stack (const ModelDataStackT< Model > &im_stack, ParamVecT< Model > &theta_est_↩ stack, VecT &rllh_stack, CubeT &obsI_stack)
- void estimate_profile_stack (const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &values, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_↩ parameters)
- Model & get_model ()
- void set_model (Model &new_model)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im)

- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, double &rllh)
- StencilT< Model > estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- void estimate_max (const ModelDataT< Model > &im, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta, double &rllh, MatT &obsI)
- void estimate_max_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh)

Static Public Attributes

- static const double rho_cauchy_min = 0.1
- static const double rho_obj_min = 0.25
- static const double rho_obj_opt = 0.75
- static const double delta_decrease_min = 0.125
- static const double delta_decrease = 0.25
- static const double delta_increase = 2
- static const double min_scaling = 1.0e-5
- static const double max_scaling = 1.0e5
- static const double delta_init_min = 1.0e-3
- static const double delta_init_max = 1.0e3
- static const double boundary_stepback_min_kappa = 1.0 - 1.0e-5
- static constexpr int NumExitCodes = 7

Protected Member Functions

- void maximize (MaximizerData &data)
- VecT bound_step (const VecT &step_hat, const VecT &D, const VecT &theta, const VecT &lbound, const VecT &ubound)
- void record_run_statistics (const MaximizerData &data)
- StencilT< Model > compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, double &rllh)
- virtual void compute_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI)

  Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.
- StencilT< Model > compute_estimate_debug (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, ParamVecT< Model > &sequence, VecT &sequence_rllh)
- void compute_profile_estimate (const ModelDataT< Model > &im, const ParamT< Model > &theta_init, const IdxVecT &fixed_parameters, ParamT< Model > &theta_est, double &rllh)
- virtual void maximize (MaximizerData &data)=0
- bool backtrack (MaximizerData &data)
- bool convergence_test (MaximizerData &data)
- void record_walltime (ClockT::time_point start_walltime, int nimages)

Static Protected Member Functions

- static VecT compute_D_scale (const VecT &oldDscale, const VecT &grad2)
- static double compute_initial_trust_radius (const VecT &ghat)
- static double quadratic_model_value (const VecT &step, const VecT &grad, const MatT &hess)

  Quadratic model value at given step Compute a quadratic model.
- static void compute_bound_scaling_vec (const VecT &theta, const VecT &grad, const VecT &lbound, const VecT &ubound, VecT &v, VecT &Jv)

  The vector used for bound constrained TR scaling.
- static VecT compute_cauchy_point (const VecT &g, const MatT &H, double delta)
- static VecT solve_TR_subproblem (const VecT &g, const MatT &H, double delta, double epsilon)

  Exactly solver the TR subproblem even for non-positive definite H.
- static VecT solve_restricted_step_length_newton (const VecT &g, const MatT &H, double delta, double lambda↩ _lb, double lambda_ub, double epsilon)

Protected Attributes

- int max_iterations
- double epsilon = sqrt(std::numeric_limits<double>::epsilon())
- double delta = sqrt(std::numeric_limits<double>::epsilon())
- double lambda_min = 0.05
- double alpha = 1e-4
- int max_backtracks = 8
- int total_iterations = 0
- int total_backtracks = 0
- int total_fun_evals = 0
- int total_der_evals = 0
- IdxVecT exit_counts
- IdxVecT last_backtrack_idxs
- int max_threads
- int num_threads
- std::mutex mtx
- Model & model
- int num_estimations = 0
- double total_walltime = 0.

8.53.1 Detailed Description

template<class Model>
class mappel::TrustRegionMaximizer< Model >

Definition at line 364 of file estimator.h.

8.53.2 Member Typedef Documentation

8.53.2.1 template<class Model > using mappel::TrustRegionMaximizer< Model >::MaximizerData = typename IterativeMaximizer<Model>::MaximizerData

Definition at line 366 of file estimator.h.

8.53.3 Member Enumeration Documentation

8.53.3.1 template<class Model > enum mappel::IterativeMaximizer::ExitCode : IdxT [strong],[inherited]

Enumerator

Unassigned

MaxIter

MaxBacktracks

TrustRegionRadius

GradRatio

FunctionChange

StepSize

Error

Definition at line 198 of file estimator.h.

8.53.4 Constructor & Destructor Documentation

8.53.4.1 template<class Model > mappel::TrustRegionMaximizer< Model >::TrustRegionMaximizer (Model & *model,* int *max_iterations* = DEFAULT_ITERATIONS) [inline]

Definition at line 381 of file estimator.h.

8.53.5 Member Function Documentation

8.53.5.1 template<class Model > bool mappel::IterativeMaximizer< Model >::backtrack (MaximizerData & *data*) [protected],[inherited]

Definition at line 530 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::alpha, mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::im, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_backtrack(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::record_iteration(), mappel::IterativeMaximizer< Model >::MaximizerData::restore_stencil(), mappel::methods::objective::rllh(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::save_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::MaximizerData::set_stencil(), mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::step.

Referenced by mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.53.5.2 template<class Model > VecT mappel::TrustRegionMaximizer< Model >::bound_step (const VecT & *step_hat,* const VecT & *D,* const VecT & *theta,* const VecT & *lbound,* const VecT & *ubound*) [protected]

This is alpha[d] from Coleman and Li

Definition at line 1104 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::alpha, and mappel::IterativeMaximizer< Model >::MaximizerData↩ ::step.

8.53.5.3 template<class Model > void mappel::IterativeMaximizer< Model >::clear_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 504 of file estimator_impl.h.

References mappel::ThreadedEstimator< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::exit_counts, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::↩ IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::↩ IterativeMaximizer< Model >::total_iterations.

8.53.5.4 template<class Model > void mappel::TrustRegionMaximizer< Model >::compute_bound_scaling_vec (const VecT & *theta,* const VecT & *g,* const VecT & *lbound,* const VecT & *ubound,* VecT & *v,* VecT & *Jv*) [static], [protected]

The vector used for bound constrained TR scaling.

This v is from Coleman&Li (1996). It represents a scaling factor for bound constrained problems. For unconstrained problems v = sgn(grad);

In all cases

Definition at line 1068 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::lbound, mappel::sgn(), mappel::Iterative↩ Maximizer< Model >::MaximizerData::theta(), and mappel::IterativeMaximizer< Model >::MaximizerData::ubound.

8.53.5.5 template<class Model > VecT mappel::TrustRegionMaximizer< Model >::compute_cauchy_point (const VecT & *g,* const MatT & *H,* double *delta*) [static], [protected]

Definition at line 1145 of file estimator_impl.h.

8.53.5.6 template<class Model > VecT mappel::TrustRegionMaximizer< Model >::compute_D_scale (const VecT & *oldDscale,* const VecT & *grad2*) [static], [protected]

This works for either minimization or maximization. sign(grad2) is not important

Definition at line 1029 of file estimator_impl.h.

8.53.5.7 template<class Model > void **mappel::Estimator**< Model >::compute_estimate (const **ModelDataT**< Model > & *im,* const **ParamT**< Model > & *theta_init,* **ParamT**< Model > & *theta_est,* double & *rllh,* **MatT** & *obsI*) [protected], [virtual], [inherited]

Default base class implementation computes rllh and obsI seperately from stencil This should be overridden by Estimator subclasses that already have access to this information.

Definition at line 142 of file estimator_impl.h.

References mappel::methods::observed_information().

8.53.5.8 template<class Model > **StencilT**< Model > **mappel::IterativeMaximizer**< Model >::compute_estimate (const **ModelDataT**< Model > & *im,* const **ParamT**< Model > & *theta_init,* double & *rllh*) [protected], [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 628 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::print_image(), mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::stencil(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.53.5.9 template<class Model > **StencilT**< Model > **mappel::IterativeMaximizer**< Model >::compute_estimate_debug (const **ModelDataT**< Model > & *im,* const **ParamT**< Model > & *theta_init,* **ParamVecT**< Model > & *sequence,* **VecT** & *sequence_rllh*) [protected], [virtual], [inherited]

Estimators that produce a sequence of results (e.g. IterativeEstimators) can override this dummy debug implementation.

Reimplemented from mappel::Estimator< Model >.

Definition at line 653 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence(), mappel::IterativeMaximizer< Model >::MaximizerData::get_theta_sequence_rllh(), mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

8.53.5.10 template<class Model > double **mappel::TrustRegionMaximizer**< Model >::compute_initial_trust_radius (const **VecT** & *ghat*) [inline], [static], [protected]

Works for minimization or maximization. Indepdendet of sign or grad

Definition at line 1042 of file estimator_impl.h.

8.53.5.11 template<class Model > void mappel::IterativeMaximizer< Model >::compute_profile_estimate (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* const IdxVecT & *fixed_parameters,* ParamT< Model > & *theta_est,* double & *rllh*) [protected], [virtual], [inherited]

Reimplemented from mappel::Estimator< Model >.

Definition at line 672 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::record_run_statistics(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::set_fixed_parameters(), and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

8.53.5.12 template<class Model > bool mappel::IterativeMaximizer< Model >::convergence_test (MaximizerData & *data*) [protected], [inherited]

Definition at line 606 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::MaximizerData::fixed_parameter_scalar, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::IterativeMaximizer< Model >::MaximizerData::grad, mappel::IterativeMaximizer< Model >::MaximizerData::has_fixed_parameters, mappel::IterativeMaximizer< Model >::MaximizerData::record_exit(), mappel::IterativeMaximizer< Model >::MaximizerData::rllh, mappel::IterativeMaximizer< Model >::MaximizerData::saved_theta(), mappel::IterativeMaximizer< Model >::StepSize, and mappel::IterativeMaximizer< Model >::MaximizerData::theta().

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.53.5.13 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im*) [inherited]

Definition at line 59 of file estimator_impl.h.

References mappel::methods::estimate_max().

Referenced by mappel::Estimator< Model >::~Estimator().

8.53.5.14 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init*) [inherited]

Definition at line 77 of file estimator_impl.h.

References mappel::methods::estimate_max(), and mappel::methods::objective::rllh().

8.53.5.15 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* double & *rllh*) [inherited]

Definition at line 68 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.53.5.16 template<class Model > StencilT< Model > mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* double & *rllh*) [inherited]

Definition at line 85 of file estimator_impl.h.

8.53.5.17 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 97 of file estimator_impl.h.

References mappel::methods::estimate_max().

8.53.5.18 template<class Model > void mappel::Estimator< Model >::estimate_max (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta,* double & *rllh,* MatT & *obsI*) [inherited]

Definition at line 106 of file estimator_impl.h.

8.53.5.19 template<class Model > void mappel::Estimator< Model >::estimate_max_debug (const ModelDataT< Model > & *im,* const ParamT< Model > & *theta_init,* ParamT< Model > & *theta_est,* double & *rllh,* MatT & *obsI,* MatT & *sequence,* VecT & *sequence_rllh*) [inherited]

Definition at line 117 of file estimator_impl.h.

References mappel::methods::observed_information(), and mappel::methods::objective::rllh().

Referenced by mappel::Estimator< Model >::~Estimator().

8.53.5.20 template<class Model > void mappel::Estimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im_stack,* ParamVecT< Model > & *theta_est_stack,* VecT & *rllh_stack,* CubeT & *obsI_stack*) [inherited]

Definition at line 129 of file estimator_impl.h.

References mappel::methods::openmp::estimate_max_stack().

8.53.5.21 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_max_stack (const ModelDataStackT< Model > & *im,* const ParamVecT< Model > & *theta_init,* ParamVecT< Model > & *theta,* VecT & *rllh,* CubeT & *obsI*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 222 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.53.5.22 template<class Model > void mappel::ThreadedEstimator< Model >::estimate_profile_stack (const ModelDataT< Model > & *data,* const IdxVecT & *fixed_parameters,* const MatT & *values,* const ParamVecT< Model > & *theta_init,* VecT & *profile_likelihood,* ParamVecT< Model > & *profile_parameters*) [virtual], [inherited]

Implements mappel::Estimator< Model >.

Definition at line 246 of file estimator_impl.h.

References mappel::Estimator< Model >::model, mappel::ThreadedEstimator< Model >::num_threads, mappel::Estimator< Model >::record_walltime(), omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::rethrow(), and omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >::run().

8.53.5.23 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_debug_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 488 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::backtrack_idxs, mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::last_backtrack_idxs.

8.53.5.24 template<class Model > Model & mappel::Estimator< Model >::get_model ( ) [inherited]

Definition at line 45 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.53.5.25 template<class Model > StatsT mappel::IterativeMaximizer< Model >::get_stats ( ) [virtual], [inherited]

Reimplemented from mappel::ThreadedEstimator< Model >.

Definition at line 459 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::IterativeMaximizer< Model >::Error, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::FunctionChange, mappel::ThreadedEstimator< Model >::get_stats(), mappel::IterativeMaximizer< Model >::GradRatio, mappel::IterativeMaximizer< Model >::max_backtracks, mappel::IterativeMaximizer< Model >::max_iterations, mappel::IterativeMaximizer< Model >::MaxBacktracks, mappel::IterativeMaximizer< Model >::MaxIter, mappel::ThreadedEstimator< Model >::mtx, mappel::Estimator< Model >::num_estimations, mappel::IterativeMaximizer< Model >::StepSize, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, mappel::IterativeMaximizer< Model >::total_iterations, and mappel::IterativeMaximizer< Model >::TrustRegionRadius.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats().

8.53.5.26 template<class Model > void mappel::IterativeMaximizer< Model >::local_maximize (const ModelDataT< Model > & *im,* const StencilT< Model > & *theta_init,* StencilT< Model > & *stencil,* double & *rllh*) [inherited]

Perform a local maximization to finish off a simulated annealing run.

Definition at line 690 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::maximize(), mappel::Estimator< Model >::model, mappel::IterativeMaximizer< Model >::MaximizerData::rllh, and mappel::IterativeMaximizer< Model >::MaximizerData::stencil().

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal().

8.53.5.27 template<class Model > virtual void mappel::IterativeMaximizer< Model >::maximize (MaximizerData & *data*) [protected], [pure virtual], [inherited]

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), and mappel::IterativeMaximizer< Model >::local_maximize().

8.53.5.28 template<class Model > void mappel::TrustRegionMaximizer< Model >::maximize (MaximizerData & *data*) [protected]

Definition at line 862 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, mappel::methods::objective::hessian(), mappel::Estimator< Model >::model, and mappel::methods::objective::rllh().

8.53.5.29 template<class Model > double mappel::IterativeMaximizer< Model >::mean_backtracks ( ) [inherited]

8.53.5.30 template<class Model > double mappel::IterativeMaximizer< Model >::mean_der_evals ( ) [inherited]

8.53.5.31 template<class Model > double mappel::IterativeMaximizer< Model >::mean_fun_evals ( ) [inherited]

8.53.5.32 template<class Model > double mappel::IterativeMaximizer< Model >::mean_iterations ( ) [inherited]

8.53.5.33 template<class Model > std::string mappel::TrustRegionMaximizer< Model >::name ( ) const [inline], [virtual]

Implements mappel::Estimator< Model >.

Definition at line 384 of file estimator.h.

References mappel::methods::objective::grad(), and mappel::methods::objective::grad2().

8.53.5.34 template<class Model > double mappel::TrustRegionMaximizer< Model >::quadratic_model_value (const VecT & *step,* const VecT & *grad,* const MatT & *hess*) [inline], [static], [protected]

Quadratic model value at given step Compute a quadratic model.

Definition at line 1054 of file estimator_impl.h.

8.53.5.35 template<class Model > void mappel::IterativeMaximizer< Model >::record_run_statistics (const MaximizerData & *data*) [protected], [inherited]

Definition at line 517 of file estimator_impl.h.

References mappel::IterativeMaximizer< Model >::MaximizerData::exit_code, mappel::IterativeMaximizer< Model >::exit_counts, mappel::IterativeMaximizer< Model >::MaximizerData::get_backtrack_idxs(), mappel::IterativeMaximizer< Model >::last_backtrack_idxs, mappel::ThreadedEstimator< Model >::mtx, mappel::IterativeMaximizer< Model >::MaximizerData::nBacktracks, mappel::IterativeMaximizer< Model >::MaximizerData::nIterations, mappel::IterativeMaximizer< Model >::MaximizerData::save_seq, mappel::IterativeMaximizer< Model >::total_backtracks, mappel::IterativeMaximizer< Model >::total_der_evals, mappel::IterativeMaximizer< Model >::total_fun_evals, and mappel::IterativeMaximizer< Model >::total_iterations.

Referenced by mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::compute_profile_estimate().

8.53.5.36 template<class Model > void mappel::Estimator< Model >::record_walltime (ClockT::time_point *start_walltime,* int *nimages*) [protected], [inherited]

Definition at line 203 of file estimator_impl.h.

Referenced by mappel::ThreadedEstimator< Model >::estimate_max_stack(), and mappel::ThreadedEstimator< Model >::estimate_profile_stack().

8.53.5.37 template<class Model > void mappel::Estimator< Model >::set_model (Model & *new_model*) [inherited]

Definition at line 49 of file estimator_impl.h.

Referenced by mappel::Estimator< Model >::~Estimator().

8.53.5.38 template<class Model > VecT mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton (const VecT & *g,* const MatT & *H,* double *delta,* double *lambda_lb,* double *lambda_ub,* double *epsilon*) [static], [protected]

Definition at line 1254 of file estimator_impl.h.

References mappel::cholesky(), mappel::cholesky_convert_lower_triangular(), mappel::cholesky_solve(), mappel::IterativeMaximizer< Model >::delta, mappel::IterativeMaximizer< Model >::epsilon, and mappel::IterativeMaximizer< Model >::lambda_min.

8.53.5.39 template<class Model > VecT mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem (const VecT & *g,* const MatT & *H,* double *delta,* double *epsilon*) [static], [protected]

Exactly solver the TR subproblem even for non-positive definite H.

This method is a hybrid technique mixing ideas from Geyer (2013) and the "trust" R-package Nocetal and Wright (2000) More and Sorensen (1981)

Definition at line 1162 of file estimator_impl.h.

References mappel::cholesky(), mappel::cholesky_solve(), mappel::IterativeMaximizer< Model >::delta, and mappel::IterativeMaximizer< Model >::lambda_min.

8.53.6 Member Data Documentation

8.53.6.1 template<class Model > double mappel::IterativeMaximizer< Model >::alpha = 1e-4 [protected], [inherited]

Definition at line 232 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), and mappel::TrustRegionMaximizer< Model >::bound_step().

8.53.6.2 template<class Model > const double mappel::TrustRegionMaximizer< Model >::boundary_stepback_min_kappa = 1.0 - 1.0e-5 [static]

Definition at line 379 of file estimator.h.

8.53.6.3 template<class Model > double mappel::IterativeMaximizer< Model >::delta = sqrt(std::numeric_limits<double>::epsilon()) [protected], [inherited]

Definition at line 229 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.53.6.4 template<class Model > const double mappel::TrustRegionMaximizer< Model >::delta_decrease = 0.25 [static]

Definition at line 372 of file estimator.h.

8.53.6.5 template<class Model > const double mappel::TrustRegionMaximizer< Model >::delta_decrease_min = 0.125 [static]

Definition at line 371 of file estimator.h.

8.53.6.6 template<class Model > const double mappel::TrustRegionMaximizer< Model >::delta_increase = 2 [static]

Definition at line 373 of file estimator.h.

8.53.6.7 template<class Model > const double mappel::TrustRegionMaximizer< Model >::delta_init_max = 1.0e3 [static]

Definition at line 378 of file estimator.h.

8.53.6.8 template<class Model > const double mappel::TrustRegionMaximizer< Model >::delta_init_min = 1.0e-3 [static]

Definition at line 377 of file estimator.h.

8.53.6.9 template<class Model > double mappel::IterativeMaximizer< Model >::epsilon = sqrt(std::numeric_limits<double>::epsilon()) [protected], [inherited]

Definition at line 228 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::convergence_test(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::TrustRegionMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton().

8.53.6.10 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::exit_counts [protected], [inherited]

Definition at line 240 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.53.6.11 template<class Model > double mappel::IterativeMaximizer< Model >::lambda_min = 0.05 [protected], [inherited]

Definition at line 231 of file estimator.h.

Referenced by mappel::TrustRegionMaximizer< Model >::solve_restricted_step_length_newton(), and mappel::TrustRegionMaximizer< Model >::solve_TR_subproblem().

8.53.6.12 template<class Model > IdxVecT mappel::IterativeMaximizer< Model >::last_backtrack_idxs [protected], [inherited]

Definition at line 242 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::get_debug_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.53.6.13 template<class Model > int mappel::IterativeMaximizer< Model >::max_backtracks = 8 [protected], [inherited]

Definition at line 233 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::backtrack(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), and mappel::IterativeMaximizer< Model >::get_stats().

8.53.6.14 template<class Model > int mappel::IterativeMaximizer< Model >::max_iterations [protected], [inherited]

Definition at line 225 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::get_stats(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), and mappel::QuasiNewtonMaximizer< Model >::maximize().

8.53.6.15 template<class Model > const double mappel::TrustRegionMaximizer< Model >::max_scaling = 1.0e5 [static]

Definition at line 376 of file estimator.h.

8.53.6.16 template<class Model > int mappel::ThreadedEstimator< Model >::max_threads [protected], [inherited]

Definition at line 127 of file estimator.h.

8.53.6.17 template<class Model > const double mappel::TrustRegionMaximizer< Model >::min_scaling = 1.0e-5 [static]

Definition at line 375 of file estimator.h.

8.53.6.18 template<class Model > Model& mappel::Estimator< Model >::model [protected], [inherited]

Definition at line 97 of file estimator.h.

Referenced by mappel::SimulatedAnnealingMaximizer< Model >::anneal(), mappel::IterativeMaximizer< Model >::backtrack(), mappel::ThreadedEstimator< Model >::clear_stats(), mappel::CGaussMLE< Model >::compute_estimate(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate(), mappel::IterativeMaximizer< Model >::compute_estimate(), mappel::CGaussMLE< Model >::compute_estimate_debug(), mappel::SimulatedAnnealingMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_estimate_debug(), mappel::IterativeMaximizer< Model >::compute_profile_estimate(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), mappel::IterativeMaximizer< Model >::local_maximize(), mappel::NewtonDiagonalMaximizer< Model >::maximize(), mappel::NewtonMaximizer< Model >::maximize(), mappel::QuasiNewtonMaximizer< Model >::maximize(), and mappel::TrustRegionMaximizer< Model >::maximize().

8.53.6.19 template<class Model > std::mutex mappel::ThreadedEstimator< Model >::mtx [protected], [inherited]

Definition at line 129 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.53.6.20 template<class Model > int mappel::Estimator< Model >::num_estimations = 0 [protected], [inherited]

Definition at line 100 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::get_stats().

8.53.6.21 template<class Model > int mappel::ThreadedEstimator< Model >::num_threads [protected], [inherited]

Definition at line 128 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::clear_stats(), mappel::ThreadedEstimator< Model >::estimate_max_stack(), mappel::ThreadedEstimator< Model >::estimate_profile_stack(), and mappel::ThreadedEstimator< Model >::get_stats().

8.53.6.22 template<class Model > constexpr int mappel::IterativeMaximizer< Model >::NumExitCodes = 7 [static], [inherited]

Definition at line 197 of file estimator.h.

8.53.6.23 template<class Model > const double mappel::TrustRegionMaximizer< Model >::rho_cauchy_min = 0.1 [static]

Definition at line 368 of file estimator.h.

8.53.6.24 template<class Model > const double mappel::TrustRegionMaximizer< Model >::rho_obj_min = 0.25 [static]

Definition at line 369 of file estimator.h.

8.53.6.25 template<class Model > const double mappel::TrustRegionMaximizer< Model >::rho_obj_opt = 0.75 [static]

Definition at line 370 of file estimator.h.

8.53.6.26 template<class Model > int mappel::IterativeMaximizer< Model >::total_backtracks = 0 [protected], [inherited]

Definition at line 237 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.53.6.27 template<class Model > int mappel::IterativeMaximizer< Model >::total_der_evals = 0 [protected], [inherited]

Definition at line 239 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.53.6.28 template<class Model > int mappel::IterativeMaximizer< Model >::total_fun_evals = 0 [protected], [inherited]

Definition at line 238 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.53.6.29 template<class Model > int mappel::IterativeMaximizer< Model >::total_iterations = 0 [protected], [inherited]

Definition at line 236 of file estimator.h.

Referenced by mappel::IterativeMaximizer< Model >::clear_stats(), mappel::IterativeMaximizer< Model >::get_stats(), and mappel::IterativeMaximizer< Model >::record_run_statistics().

8.53.6.30 template<class Model > double mappel::Estimator< Model >::total_walltime = 0. [protected], [inherited]

Definition at line 101 of file estimator.h.

Referenced by mappel::ThreadedEstimator< Model >::get_stats().

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

- estimator.h
- estimator_impl.h

9 File Documentation

9.1 display.cpp File Reference

```
#include "Mappel/display.h"
```

Namespaces

- mappel

Functions

- const char * mappel::lambda_term_color (int size, int Lidx)
- ostream & mappel::print_centered_title (ostream &out, char fill, int width, const char *title=nullptr)
- ostream & mappel::print_labeled_image (ostream &out, const arma::mat &im, const char *title, const char *color)
- template<>
  std::ostream & mappel::print_image (std::ostream &out, const arma::vec &im)
- template<>
  std::ostream & mappel::print_image (std::ostream &out, const arma::mat &im)
- template<>
  std::ostream & mappel::print_image (std::ostream &out, const arma::cube &im)

Variables

- const char * mappel::TERM_BLACK ="1;30"
- const char * mappel::TERM_RED ="1;31"
- const char * mappel::TERM_GREEN ="1;32"
- const char * mappel::TERM_YELLOW ="1;33"
- const char * mappel::TERM_BLUE ="1;34"
- const char * mappel::TERM_MAGENTA ="1;35"
- const char * mappel::TERM_CYAN ="1;36"
- const char * mappel::TERM_WHITE ="1;37"
- const char * mappel::TERM_DIM_BLACK ="0;30"
- const char * mappel::TERM_DIM_RED ="0;31"
- const char * mappel::TERM_DIM_GREEN ="0;32"
- const char * mappel::TERM_DIM_YELLOW ="0;33"
- const char * mappel::TERM_DIM_BLUE ="0;34"
- const char * mappel::TERM_DIM_MAGENTA ="0;35"
- const char * mappel::TERM_DIM_CYAN ="0;36"
- const char * mappel::TERM_DIM_WHITE ="0;37"

9.1.1 Detailed Description

Author

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

Date

03-23-2014

9.2 display.h File Reference

```
#include <iostream>
#include <iomanip>
#include <armadillo>
```

Namespaces

- mappel

Functions

- template<class ImageT >
  std::ostream & mappel::print_image (std::ostream &out, const ImageT &im)
- template<class Vec >
  std::ostream & mappel::print_vec_row (std::ostream &out, const Vec &vec, const char *header, int header_width, const char *color=nullptr)

9.2.1 Detailed Description

Author

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Date

03-23-2014

9.3 estimator.h File Reference

The class declaration and inline and templated functions for the Estimator class hierarchy.

```
#include <exception>
#include <fstream>
#include <string>
#include <limits>
#include <memory>
#include <mutex>
#include <map>
#include "Mappel/rng.h"
#include "cGaussMLE/cGaussMLE.h"
#include <chrono>
#include "Mappel/util.h"
```

Classes

- class mappel::Estimator< Model >
- class mappel::ThreadedEstimator< Model >
- class mappel::HeuristicEstimator< Model >
- class mappel::CGaussHeuristicEstimator< Model >
- class mappel::CGaussMLE< Model >
- class mappel::SimulatedAnnealingMaximizer< Model >
- class mappel::IterativeMaximizer< Model >
- class mappel::IterativeMaximizer< Model >::MaximizerData
- class mappel::NewtonDiagonalMaximizer< Model >
- class mappel::NewtonMaximizer< Model >
- class mappel::QuasiNewtonMaximizer< Model >
- class mappel::TrustRegionMaximizer< Model >

Namespaces

- mappel

Typedefs

- typedef std::chrono::high_resolution_clock ClockT

9.3.1 Detailed Description

The class declaration and inline and templated functions for the Estimator class hierarchy.

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Date

04-01-2014

9.3.2 Typedef Documentation

9.3.2.1 typedef std::chrono::high_resolution_clock ClockT

Definition at line 25 of file estimator.h.

9.4 estimator_impl.h File Reference

```
#include <thread>
#include <cmath>
#include <armadillo>
#include "estimator.h"
#include "Mappel/rng.h"
#include "Mappel/numerical.h"
#include "Mappel/display.h"
```

Namespaces

- mappel

Functions

- template<class Model >
  std::ostream & mappel::operator<< (std::ostream &out, Estimator< Model > &estimator)

9.4.1 Detailed Description

Author

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

Date

01-15-2014

9.5 estimator_statics.cpp File Reference

```
#include "Mappel/Gauss1DMAP.h"
#include "Mappel/estimator_impl.h"
```

Namespaces

- mappel

9.5.1 Detailed Description

Author

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

Date

01-15-2014

9.6 Gauss1DMAP.cpp File Reference

The class definition and template Specializations for Gauss1DMAP.

```
#include "Mappel/Gauss1DMAP.h"
```

Namespaces

- mappel

9.6.1 Detailed Description

The class definition and template Specializations for Gauss1DMAP.

Author

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

Date

2014-2019

9.7 Gauss1DMAP.h File Reference

The class declaration and inline and templated functions for Gauss1DMAP.

```
#include "Mappel/Gauss1DModel.h"
#include "Mappel/PoissonNoise1DObjective.h"
#include "Mappel/MAPEstimator.h"
#include "Mappel/model_methods.h"
```

Classes

- class mappel::Gauss1DMAP

  A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.

Namespaces

- mappel

9.7.1 Detailed Description

The class declaration and inline and templated functions for Gauss1DMAP.

Author

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

Date

2014-2019

9.8 Gauss1DMLE.cpp File Reference

The class definition and template Specializations for Gauss1DMLE.

```
#include "Mappel/Gauss1DMLE.h"
```

Namespaces

- mappel

9.8.1 Detailed Description

The class definition and template Specializations for Gauss1DMLE.

Author

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

Date

2014-2019

9.9 Gauss1DMLE.h File Reference

The class declaration and inline and templated functions for Gauss1DMLE.

```
#include "Mappel/Gauss1DModel.h"
#include "Mappel/PoissonNoise1DObjective.h"
#include "Mappel/MLEstimator.h"
#include "Mappel/model_methods.h"
```

Classes

- class mappel::Gauss1DMLE

  A 1D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective.

Namespaces

- mappel

9.9.1 Detailed Description

The class declaration and inline and templated functions for Gauss1DMLE.

Author

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

Date

2014-2019

9.10 Gauss1DModel.cpp File Reference

The class definition and template Specializations for Gauss1DModel.

```
#include "Mappel/Gauss1DModel.h"
#include "Mappel/stencil.h"
```

Namespaces

- mappel

Functions

- std::ostream & mappel::operator<< (std::ostream &out, const Gauss1DModel::Stencil &s)

9.10.1 Detailed Description

The class definition and template Specializations for Gauss1DModel.

Author

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

Date

2014-2019

9.11 Gauss1DModel.h File Reference

The class declaration and inline and templated functions for Gauss1DModel.

```
#include "Mappel/PointEmitterModel.h"
#include "Mappel/ImageFormat1DBase.h"
#include "Mappel/MCMCAdaptor1D.h"
```

Classes

- class mappel::Gauss1DModel

  A base class for 1D Gaussian PSF with a fixed sigma (standard dev.)
- class mappel::Gauss1DModel::Stencil

  Stencil for 1D fixed-sigma models.

Namespaces

- mappel

9.11.1 Detailed Description

The class declaration and inline and templated functions for Gauss1DModel.

Author

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

Date

2014-2019

9.12 Gauss1DsMAP.cpp File Reference

The class definition and template Specializations for Gauss1DsMAP.

```
#include "Mappel/Gauss1DsMAP.h"
```

Namespaces

- mappel

9.12.1 Detailed Description

The class definition and template Specializations for Gauss1DsMAP.

Author

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

Date

2017

9.13 Gauss1DsMAP.h File Reference

The class declaration and inline and templated functions for Gauss1DsMAP.

```
#include "Mappel/Gauss1DsModel.h"
#include "Mappel/PoissonNoise1DObjective.h"
#include "Mappel/MAPEstimator.h"
#include "Mappel/model_methods.h"
```

Classes

- class mappel::Gauss1DsMAP

  A 1D Gaussian with variable PSF sigma under an Poisson read noise assumption and MAP Objective.

Namespaces

- mappel

9.13.1 Detailed Description

The class declaration and inline and templated functions for Gauss1DsMAP.

Author

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

Date

2014-2019

9.14 Gauss1DsMLE.cpp File Reference

The class definition and template Specializations for Gauss1DsMLE.

```
#include "Mappel/Gauss1DsMLE.h"
```

Namespaces

- mappel

9.14.1 Detailed Description

The class definition and template Specializations for Gauss1DsMLE.

Author

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

Date

2017

9.15 Gauss1DsMLE.h File Reference

The class declaration and inline and templated functions for Gauss1DsMLE.

```
#include "Mappel/Gauss1DsModel.h"
#include "Mappel/PoissonNoise1DObjective.h"
#include "Mappel/MLEstimator.h"
#include "Mappel/model_methods.h"
```

Classes

- class mappel::Gauss1DsMLE

  A 1D Gaussian with variable PSF under an Poisson noise assumption and maximum-likelihood estimator.

Namespaces

- mappel

9.15.1 Detailed Description

The class declaration and inline and templated functions for Gauss1DsMLE.

Author

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

Date

2014-2019

9.16 Gauss1DsModel.cpp File Reference

The class definition and template Specializations for Gauss1DsModel.

```
#include "Mappel/Gauss1DsModel.h"
#include "Mappel/stencil.h"
```

Namespaces

- mappel

Functions

- std::ostream & mappel::operator<< (std::ostream &out, const Gauss1DsModel::Stencil &s)

9.16.1 Detailed Description

The class definition and template Specializations for Gauss1DsModel.

Author

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

Date

2014-2019

9.17 Gauss1DsModel.h File Reference

The class declaration and inline and templated functions for Gauss1DsModel.

```
#include "Mappel/PointEmitterModel.h"
#include "Mappel/ImageFormat1DBase.h"
#include "Mappel/MCMCAdaptor1Ds.h"
```

Classes

- class mappel::Gauss1DsModel

  Base class for 1D Gaussian PSF with variable Gaussian sigma (standard deviation) measured in units of pixels.
- class mappel::Gauss1DsModel::Stencil

  Stencil for 1D variable-sigma models.

Namespaces

- mappel

9.17.1 Detailed Description

The class declaration and inline and templated functions for Gauss1DsModel.

Author

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

Date

2014-2019

9.18 Gauss2DMAP.cpp File Reference

The class definition and template Specializations for Gauss2DMAP.

```
#include "Mappel/Gauss2DMAP.h"
```

Namespaces

- mappel

9.18.1 Detailed Description

The class definition and template Specializations for Gauss2DMAP.

Author

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

Date

2014-2019

9.19 Gauss2DMAP.h File Reference

The class declaration and inline and templated functions for Gauss2DMAP.

```
#include "Mappel/Gauss2DModel.h"
#include "Mappel/PoissonNoise2DObjective.h"
#include "Mappel/MAPEstimator.h"
#include "Mappel/model_methods.h"
```

Classes

- class mappel::Gauss2DMAP

  A 2D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.

Namespaces

- mappel

9.19.1 Detailed Description

The class declaration and inline and templated functions for Gauss2DMAP.

Author

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

Date

2014-2019

9.20 Gauss2DMLE.cpp File Reference

The class definition and template Specializations for Gauss2DMLE.

```
#include "Mappel/Gauss2DMLE.h"
```

Namespaces

- mappel

9.20.1 Detailed Description

The class definition and template Specializations for Gauss2DMLE.

Author

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

Date

2014-2019

9.21 Gauss2DMLE.h File Reference

The class declaration and inline and templated functions for Gauss2DMLE.

```
#include "Mappel/Gauss2DModel.h"
#include "Mappel/PoissonNoise2DObjective.h"
#include "Mappel/MLEstimator.h"
#include "Mappel/model_methods.h"
```

Classes

- class mappel::Gauss2DMLE

  A 2D Gaussian with fixed PSF under an Poisson noise assumption and maximum-likelihood objective.

Namespaces

- mappel

9.21.1 Detailed Description

The class declaration and inline and templated functions for Gauss2DMLE.

Author

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

Date

2014-2019

9.22 Gauss2DModel.cpp File Reference

The class definition and template Specializations for Gauss2DModel.

```
#include "Mappel/Gauss2DModel.h"
#include "Mappel/stencil.h"
```

Namespaces

- mappel

Functions

- std::ostream & mappel::operator<< (std::ostream &out, const Gauss2DModel::Stencil &s)

9.22.1 Detailed Description

The class definition and template Specializations for Gauss2DModel.

Author

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

Date

2014-2019

9.23 Gauss2DModel.h File Reference

The class declaration and inline and templated functions for Gauss2DModel.

```
#include "Mappel/PointEmitterModel.h"
#include "Mappel/ImageFormat2DBase.h"
#include "Mappel/MCMCAdaptor2D.h"
#include "Mappel/Gauss1DMAP.h"
```

Classes

- class mappel::Gauss2DModel

  A base class for 2D Gaussian PSF with fixed but possibly asymmetric sigma.
- class mappel::Gauss2DModel::Stencil

  Stencil for 2D fixed-sigma models.

Namespaces

- mappel

Functions

- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DModel, Model >::value, ParamT< Model > >::type mappel::cgauss_heuristic_compute_estimate (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DModel, Model >::value, ParamT< Model > >::type mappel::cgauss_compute_estimate (Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DModel, Model >::value, ParamT< Model > >::type mappel::cgauss_compute_estimate_debug (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations, ParamVecT< Model > &sequence)

9.23.1 Detailed Description

The class declaration and inline and templated functions for Gauss2DModel.

Author

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

Date

2014-2019

9.24 Gauss2DsMAP.cpp File Reference

The class definition and template Specializations for Gauss2DsMAP.

```
#include "Mappel/Gauss2DsMAP.h"
```

Namespaces

- mappel

9.24.1 Detailed Description

The class definition and template Specializations for Gauss2DsMAP.

Author

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

Date

2014-2019

9.25 Gauss2DsMAP.h File Reference

The class declaration and inline and templated functions for Gauss2DsMAP.

```
#include "Mappel/Gauss2DsModel.h"
#include "Mappel/PoissonNoise2DObjective.h"
#include "Mappel/MLEstimator.h"
#include "Mappel/model_methods.h"
```

Classes

- class mappel::Gauss2DsMAP

  A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum a-posteriori objective.

Namespaces

- mappel

9.25.1 Detailed Description

The class declaration and inline and templated functions for Gauss2DsMAP.

Author

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

Date

2014-2019

9.26 Gauss2DsMLE.cpp File Reference

The class definition and template Specializations for Gauss2DsMLE.

```
#include "Mappel/Gauss2DsMLE.h"
```

Namespaces

- mappel

9.26.1 Detailed Description

The class definition and template Specializations for Gauss2DsMLE.

Author

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

Date

2014-2019

9.27 Gauss2DsMLE.h File Reference

The class declaration and inline and templated functions for Gauss2DsMLE.

```
#include "Mappel/Gauss2DsModel.h"
#include "Mappel/PoissonNoise2DObjective.h"
#include "Mappel/MLEstimator.h"
#include "Mappel/model_methods.h"
```

Classes

- class mappel::Gauss2DsMLE

  A 2D Gaussian with a variable scalar PSF sigma under a Poisson noise assumption using a maximum-likelihood objective.

Namespaces

- mappel

9.27.1 Detailed Description

The class declaration and inline and templated functions for Gauss2DsMLE.

Author

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

Date

2014-2019

9.28 Gauss2DsModel.cpp File Reference

The class definition and template Specializations for Gauss2DsModel.

```
#include "Mappel/Gauss2DsModel.h"
#include "Mappel/stencil.h"
```

Namespaces

- mappel

Functions

- std::ostream & mappel::operator<< (std::ostream &out, const Gauss2DsModel::Stencil &s)

9.28.1 Detailed Description

The class definition and template Specializations for Gauss2DsModel.

Author

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

Date

2014-2019

9.29 Gauss2DsModel.h File Reference

The class declaration and inline and templated functions for Gauss2DsModel.

```
#include "Mappel/PointEmitterModel.h"
#include "Mappel/ImageFormat2DBase.h"
#include "Mappel/MCMCAdaptor2Ds.h"
#include "Mappel/Gauss1DsMAP.h"
```

Classes

- class mappel::Gauss2DsModel

  A base class for 2D Gaussian PSF where the gaussian sigma is controlled by a single scalar parameter which is called sigma_ratio. The size of the gaussian psf is sigma_ratio∗psf_sigma, where psf_sigma is considered as a vector [psf_↩ sigmaX, psf_sigmaY].
- class mappel::Gauss2DsModel::Stencil

  Stencil for 2D scalar-sigma models.

Namespaces

- mappel

Functions

- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsModel, Model >::value, ParamT< Model > >::type mappel↩ ::cgauss_heuristic_compute_estimate (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsModel, Model >::value, ParamT< Model > >::type mappel↩ ::cgauss_compute_estimate (Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsModel, Model >::value, ParamT< Model > >::type mappel↩ ::cgauss_compute_estimate_debug (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations, ParamVecT< Model > &sequence)

9.29.1 Detailed Description

The class declaration and inline and templated functions for Gauss2DsModel.

Author

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

Date

2014-2019

9.30 Gauss2DsxyMAP.h File Reference

The class declaration and inline and templated functions for Gauss2DsxyMAP.

```
#include "Mappel/PoissonNoise2DObjective.h"
#include "Mappel/MAPEstimator.h"
#include "Mappel/Gauss1DModel.h"
#include "Mappel/model_methods.h"
```

Classes

- class mappel::Gauss2DsxyMAP

  A 1D Gaussian with fixed PSF under an Poisson Read Noise assumption and MAP Objective.

Namespaces

- mappel

9.30.1 Detailed Description

The class declaration and inline and templated functions for Gauss2DsxyMAP.

Author

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

Date

2017

9.31 Gauss2DsxyModel.h File Reference

The class declaration and inline and templated functions for Gauss2DsxyModel.

```
#include "Mappel/PointEmitterModel.h"
#include "Mappel/ImageFormat2DBase.h"
#include "Mappel/Gauss1DsMAP.h"
```

Classes

- class mappel::Gauss2DsxyModel

  A base class for 2D Gaussian PSF with axis-aligned gaussian with free parameters for both sigma_x and sigma_y. Gaussian sigma parameters sigma_x and sigma_y are measured in units of pixels. The model has 6 parameters, [x,y,I,bg,sigma_x,sigma_y].
- class mappel::Gauss2DsxyModel::Stencil

  Stencil for 2D free-sigma (astigmatic) models.

Namespaces

- mappel

Functions

- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsxyModel, Model >::value, ParamT< Model > >::type mappel::cgauss_heuristic_compute_estimate (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsxyModel, Model >::value, ParamT< Model > >::type mappel::cgauss_compute_estimate (Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations)
- template<class Model >
  std::enable_if< std::is_base_of< Gauss2DsxyModel, Model >::value, ParamT< Model > >::type mappel::cgauss_compute_estimate_debug (const Model &model, const ModelDataT< Model > &im, const ParamT< Model > &theta_init, int max_iterations, ParamVecT< Model > &sequence)

9.31.1 Detailed Description

The class declaration and inline and templated functions for Gauss2DsxyModel.

Author

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

Date

2014-2019

9.32 ImageFormat1DBase.cpp File Reference

The class definition and template Specializations for ImageFormat1DBase.

```
#include "Mappel/ImageFormat1DBase.h"
```

Namespaces

- mappel

9.32.1 Detailed Description

The class definition and template Specializations for ImageFormat1DBase.

Author

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

Date

2014-2019

9.33 ImageFormat1DBase.h File Reference

The class declaration and inline and templated functions for ImageFormat1DBase.

```
#include "Mappel/util.h"
#include "Mappel/ImageFormat2DBase.h"
```

Classes

- class mappel::ImageFormat1DBase

  A virtual base class for 2D image localization objectives.

Namespaces

- mappel
- mappel::methods

  Templated functions for operating on a PointEmitterModel.

Functions

- template<class Model >
  ReturnIfSubclassT< ImageT< Model >, Model, ImageFormat1DBase > mappel::methods::model_image (const Model &model, const StencilT< Model > &s)

9.33.1 Detailed Description

The class declaration and inline and templated functions for ImageFormat1DBase.

Author

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

Date

2014-2019 The virtual base class for all point 2D image based emitter Models and Objectives

9.34 ImageFormat2DBase.cpp File Reference

The class definition and template Specializations for ImageFormat2DBase.

```
#include "Mappel/ImageFormat2DBase.h"
```

Namespaces

- mappel

9.34.1 Detailed Description

The class definition and template Specializations for ImageFormat2DBase.

Author

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

Date

2014-2019

9.35 ImageFormat2DBase.h File Reference

The class declaration and inline and templated functions for ImageFormat2DBase.

```
#include "Mappel/util.h"
```

Classes

- class mappel::ImageFormat2DBase

  A virtual base class for 2D image localization objectives.

Namespaces

- mappel
- mappel::methods

  Templated functions for operating on a PointEmitterModel.

Functions

- template<class Model >
  ReturnIfSubclassT< ImageT< Model >, Model, ImageFormat2DBase > mappel::methods::model_image (const Model &model, const typename Model::Stencil &s)

9.35.1 Detailed Description

The class declaration and inline and templated functions for ImageFormat2DBase.

Author

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

Date

2014-2019 The virtual base class for all point 2D image based emitter Models and Objectives

9.36 Install.md File Reference

9.37 MAPEstimator.h File Reference

Class declaration and inline and templated functions for MAPEstimator.

```
#include "Mappel/PointEmitterModel.h"
#include "Mappel/MLEstimator.h"
```

Classes

- class mappel::MAPEstimator

  A Mixin class to configure a for MLE estimation (null prior).

Namespaces

- mappel
- mappel::methods

  Templated functions for operating on a PointEmitterModel.
- mappel::methods::objective
- mappel::methods::objective::debug

Functions

- template<class Model >
  ReturnIfSubclassT< double, Model, MAPEstimator > mappel::methods::objective::llh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< double, Model, MAPEstimator > mappel::methods::objective::rllh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< ParamT< Model >, Model, MAPEstimator > mappel::methods::objective::grad (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< void, Model, MAPEstimator > mappel::methods::objective::grad2 (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, ParamT< Model > &grad2)
- template<class Model >
  ReturnIfSubclassT< void, Model, MAPEstimator > mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, MAPEstimator > mappel::methods::objective::debug::llh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, MAPEstimator > mappel::methods::objective::debug::rllh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< MatT, Model, MAPEstimator > mappel::methods::objective::debug::grad_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< CubeT, Model, MAPEstimator > mappel::methods::objective::debug::hessian_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)

9.37.1 Detailed Description

Class declaration and inline and templated functions for MAPEstimator.

Author

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

Date

2017-2019

9.38 mcmc.cpp File Reference

```
#include "Mappel/util.h"
```

Namespaces

- mappel
- mappel::mcmc

Functions

- IdxT mappel::mcmc::num_oversample (IdxT Nsample, IdxT Nburnin, IdxT thin)
- MatT mappel::mcmc::thin_sample (MatT &sample, IdxT Nburnin, IdxT thin)
- void mappel::mcmc::thin_sample (const MatT &sample, const VecT &sample_rllh, IdxT Nburnin, IdxT thin, MatT &subsample, VecT &subsample_rllh)

9.39 mcmc.h File Reference

Templated MCMC methods for posterior estimation.

```
#include <cmath>
#include "Mappel/util.h"
#include "Mappel/rng.h"
#include <trng/uniform01_dist.hpp>
```

Namespaces

- mappel
- mappel::mcmc

Functions

- IdxT mappel::mcmc::num_oversample (IdxT Nsample, IdxT Nburnin, IdxT thin)
- MatT mappel::mcmc::thin_sample (MatT &sample, IdxT Nburnin, IdxT thin)
- void mappel::mcmc::thin_sample (const MatT &sample, const VecT &sample_rllh, IdxT Nburnin, IdxT thin, MatT &subsample, VecT &subsample_rllh)
- void mappel::mcmc::estimate_sample_posterior (const MatT &sample, VecT &theta_posterior_mean, MatT &theta_posterior_cov)
- template<class Model >
  void mappel::mcmc::sample_posterior (Model &model, const ModelDataT< Model > &im, const StencilT< Model > &theta_init, MatT &sample, VecT &sample_rllh)
- template<class Model >
  void mappel::mcmc::sample_posterior_debug (Model &model, const ModelDataT< Model > &im, const StencilT< Model > &theta_init, MatT &sample, VecT &sample_rllh, MatT &candidate, VecT &candidate_↩ rllh)

9.39.1 Detailed Description

Templated MCMC methods for posterior estimation.

Author

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

Date

2015-2019

9.40 MCMCAdaptor1D.cpp File Reference

The class definition and template Specializations for MCMCAdaptor1D.

```
#include "Mappel/MCMCAdaptor1D.h"
```

Namespaces

- mappel

9.40.1 Detailed Description

The class definition and template Specializations for MCMCAdaptor1D.

Author

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

Date

2018

9.41 MCMCAdaptor1D.h File Reference

The class declaration and inline and templated functions for MCMCAdaptor1D.

```
#include "Mappel/MCMCAdaptorBase.h"
#include "Mappel/PointEmitterModel.h"
```

Classes

- class mappel::MCMCAdaptor1D

Namespaces

- mappel

9.41.1 Detailed Description

The class declaration and inline and templated functions for MCMCAdaptor1D.

Author

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

Date

2018-2019

9.42 MCMCAdaptor1Ds.cpp File Reference

The class definition and template Specializations for MCMCAdaptor1Ds.

```
#include "Mappel/MCMCAdaptor1Ds.h"
```

Namespaces

- mappel

9.42.1 Detailed Description

The class definition and template Specializations for MCMCAdaptor1Ds.

Author

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

Date

2018

9.43 MCMCAdaptor1Ds.h File Reference

The class declaration and inline and templated functions for MCMCAdaptor1Ds.

```
#include "Mappel/MCMCAdaptor1D.h"
```

Classes

- class mappel::MCMCAdaptor1Ds

Namespaces

- mappel

9.43.1 Detailed Description

The class declaration and inline and templated functions for MCMCAdaptor1Ds.

Author

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

Date

2018-2019

9.44 MCMCAdaptor2D.cpp File Reference

The class definition and template Specializations for MCMCAdaptor2D.

```
#include "Mappel/MCMCAdaptor2D.h"
```

Namespaces

- mappel

9.44.1 Detailed Description

The class definition and template Specializations for MCMCAdaptor2D.

Author

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

Date

2018

9.45 MCMCAdaptor2D.h File Reference

The class declaration and inline and templated functions for MCMCAdaptor2D.

```
#include "Mappel/MCMCAdaptor1D.h"
```

Classes

- class mappel::MCMCAdaptor2D

Namespaces

- mappel

9.45.1 Detailed Description

The class declaration and inline and templated functions for MCMCAdaptor2D.

Author

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

Date

2018-2019

9.46 MCMCAdaptor2Ds.cpp File Reference

The class definition and template Specializations for MCMCAdaptor2Ds.

```
#include "Mappel/MCMCAdaptor2Ds.h"
```

Namespaces

- mappel

9.46.1 Detailed Description

The class definition and template Specializations for MCMCAdaptor2Ds.

Author

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

Date

2018

9.47 MCMCAdaptor2Ds.h File Reference

The class declaration and inline and templated functions for MCMCAdaptor2Ds.

```
#include "Mappel/MCMCAdaptor2D.h"
```

Classes

- class mappel::MCMCAdaptor2Ds

Namespaces

- mappel

9.47.1 Detailed Description

The class declaration and inline and templated functions for MCMCAdaptor2Ds.

Author

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

Date

2018-2019

9.48 MCMCAdaptorBase.cpp File Reference

The class definition and template Specializations for MCMCAdaptorBase.

```
#include "Mappel/MCMCAdaptorBase.h"
```

Namespaces

- mappel

9.48.1 Detailed Description

The class definition and template Specializations for MCMCAdaptorBase.

Author

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

Date

2014-2018

9.49 MCMCAdaptorBase.h File Reference

The class declaration and inline and templated functions for MCMCAdaptorBase.

```
#include "Mappel/util.h"
```

Classes

- class mappel::MCMCAdaptorBase

Namespaces

- mappel

9.49.1 Detailed Description

The class declaration and inline and templated functions for MCMCAdaptorBase.

Author

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

Date

2018

9.50 MLEstimator.h File Reference

Class declaration and inline and templated functions for MLEstimator.

```
#include "Mappel/PointEmitterModel.h"
#include "Mappel/MAPEstimator.h"
```

Classes

- class mappel::MLEstimator

  A Mixin class to configure a for MLE estimation (null prior).

Namespaces

- mappel
- mappel::methods

  Templated functions for operating on a PointEmitterModel.
- mappel::methods::objective
- mappel::methods::objective::debug

Functions

- template<class Model >
  ReturnIfSubclassT< double, Model, MLEstimator > mappel::methods::objective::llh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< double, Model, MLEstimator > mappel::methods::objective::rllh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< ParamT< Model >, Model, MLEstimator > mappel::methods::objective::grad (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< void, Model, MLEstimator > mappel::methods::objective::grad2 (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, ParamT< Model > &grad2)
- template<class Model >
  ReturnIfSubclassT< void, Model, MLEstimator > mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, MLEstimator > mappel::methods::objective::debug::llh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, MLEstimator > mappel::methods::objective::debug::rllh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< MatT, Model, MLEstimator > mappel::methods::objective::debug::grad_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< CubeT, Model, MLEstimator > mappel::methods::objective::debug::hessian_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)

9.50.1 Detailed Description

Class declaration and inline and templated functions for MLEstimator.

Author

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

Date

2017

9.51 model_methods.h File Reference

```
#include "Mappel/OMPExceptionCatcher/OMPExceptionCatcher.h"
#include "Mappel/estimator.h"
#include "Mappel/mcmc.h"
#include "Mappel/openmp_methods.h"
#include "Mappel/model_methods_impl.h"
#include "Mappel/estimator_impl.h"
```

Namespaces

- mappel
- mappel::methods

  Templated functions for operating on a PointEmitterModel.
- mappel::methods::objective
- mappel::methods::objective::debug
- mappel::methods::debug

Functions

- template<class Model >
  ImageT< Model > mappel::methods::model_image (const Model &model, const ParamT< Model > &theta)
- template<class Model , class rng_t >
  ModelDataT< Model > mappel::methods::simulate_image (Model &model, const ParamT< Model > &theta)
- template<class Model , class rng_t >
  ModelDataT< Model > mappel::methods::simulate_image (Model &model, const ParamT< Model > &theta, rng_t &rng)
- template<class Model >
  ModelDataT< Model > mappel::methods::simulate_image (Model &model, const StencilT< Model > &s)
- template<class Model >
  ModelDataT< Model > mappel::methods::simulate_image_from_model (Model &model, const ImageT< Model > &model_im)
- template<class Model >
  double mappel::methods::objective::llh (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  double mappel::methods::objective::rllh (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  ParamT< Model > mappel::methods::objective::grad (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  ParamT< Model > mappel::methods::objective::grad2 (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  void mappel::methods::objective::grad2 (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, ParamT< Model > &grad_val, ParamT< Model > &grad2_val)
- template<class Model >
  MatT mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)

- template<class Model >
  MatT mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  void mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, MatT &hess)
- template<class Model >
  MatT mappel::methods::objective::negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  MatT mappel::methods::objective::negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  void mappel::methods::objective::negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::objective::negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  VecT mappel::methods::objective::debug::llh_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  VecT mappel::methods::objective::debug::rllh_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  MatT mappel::methods::objective::debug::grad_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  CubeT mappel::methods::objective::debug::hessian_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  void mappel::methods::aposteriori_objective (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::aposteriori_objective (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::prior_objective (const Model &model, const ParamT< Model > &theta, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::likelihood_objective (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::likelihood_objective (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  ParamT< Model > mappel::methods::cr_lower_bound (const Model &model, const typename Model::Stencil &s)

  Calculate the Cramer-Rao lower bound at the given parameters.
- template<class Model >
  ParamT< Model > mappel::methods::cr_lower_bound (const Model &model, const ParamT< Model > &theta)

- template<class Model >
  MatT mappel::methods::expected_information (const Model &model, const ParamT< Model > &theta)
- template<class Model >
  MatT mappel::methods::observed_information (const Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_mode)
- template<class Model >
  MatT mappel::methods::observed_information (const Model &model, const ModelDataT< Model > &data, const StencilT< Model > &theta_mode)
- template<class Model >
  StencilT< Model > mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method)
- template<class Model >
  StencilT< Model > mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, double &rllh)
- template<class Model >
  void mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI)
- template<class Model >
  void mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI, StatsT &stats)
- template<class Model >
  void mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI)
- template<class Model >
  void mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI, StatsT &stats)
- template<class Model >
  MatT mappel::methods::estimate_mcmc_sample (Model &model, const ModelDataT< Model > &data, IdxT Nsample=1000, IdxT Nburnin=100, IdxT thin=0)
- template<class Model >
  MatT mappel::methods::estimate_mcmc_sample (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample=1000, IdxT Nburnin=100, IdxT thin=0)
- template<class Model >
  void mappel::methods::estimate_mcmc_sample (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample, IdxT Nburnin, IdxT thin, MatT &sample, VecT &sample_rllh)
- template<class Model >
  void mappel::methods::estimate_mcmc_posterior (Model &model, const ModelDataT< Model > &data, IdxT Nsample, IdxT Nburnin, IdxT thin, ParamT< Model > &posterior_mean, MatT &posterior_cov)
- template<class Model >
  void mappel::methods::estimate_mcmc_posterior (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample, IdxT Nburnin, IdxT thin, ParamT< Model > &posterior_mean, MatT &posterior_cov)
- template<class Model >
  void mappel::methods::error_bounds_expected (const Model &model, const ParamT< Model > &theta_est, double confidence, ParamT< Model > &theta_lb, ParamT< Model > &theta_ub)
- template<class Model >
  void mappel::methods::error_bounds_observed (const Model &model, const ParamT< Model > &theta_est, MatT &obsI, double confidence, ParamT< Model > &theta_lb, ParamT< Model > &theta_ub)
- template<class Model >
  void mappel::methods::error_bounds_posterior_credible (const Model &model, const MatT &sample, double confidence, ParamT< Model > &theta_mean, ParamT< Model > &theta_lb, ParamT< Model > &theta_ub)

- template<class Model >
  void mappel::methods::debug::estimate_max_debug (Model &model, const ModelDataT< Model > &data, const std::string &method, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh, StatsT &stats)
- template<class Model >
  void mappel::methods::debug::estimate_max_debug (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh, StatsT &stats)
- template<class Model >
  void mappel::methods::debug::estimate_mcmc_sample_debug (Model &model, const ModelDataT< Model > &data, IdxT Nsample, MatT &sample, VecT &sample_rllh, MatT &candidates, VecT &candidates_rllh)
- template<class Model >
  void mappel::methods::debug::estimate_mcmc_sample_debug (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample, MatT &sample, VecT &sample_rllh, MatT &candidates, VecT &candidates_rllh)

9.52 model_methods_impl.h File Reference

```
#include "Mappel/numerical.h"
```

Namespaces

- mappel
- mappel::methods

  Templated functions for operating on a PointEmitterModel.
- mappel::methods::objective
- mappel::methods::objective::debug
- mappel::methods::debug

Functions

- template<class Model >
  Model::ImageT mappel::methods::model_image (const Model &model, const ParamT< Model > &theta)
- template<class Model >
  ModelDataT< Model > mappel::methods::simulate_image (Model &model, const ParamT< Model > &theta)
- template<class Model , class RngT >
  ModelDataT< Model > mappel::methods::simulate_image (Model &model, const ParamT< Model > &theta, RngT &rng)
- template<class Model >
  ModelDataT< Model > mappel::methods::simulate_image (Model &model, const StencilT< Model > &s)
- template<class Model >
  ModelDataT< Model > mappel::methods::simulate_image_from_model (Model &model, const ImageT< Model > &model_im)
- template<class Model >
  double mappel::methods::objective::llh (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)

- template<class Model >
  double mappel::methods::objective::rllh (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  ParamT< Model > mappel::methods::objective::grad (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  ParamT< Model > mappel::methods::objective::grad2 (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  void mappel::methods::objective::grad2 (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, ParamT< Model > &grad_val, ParamT< Model > &grad2_val)
- template<class Model >
  MatT mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  MatT mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  void mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::objective::hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, MatT &hess)
- template<class Model >
  MatT mappel::methods::objective::negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  MatT mappel::methods::objective::negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  void mappel::methods::objective::negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::objective::negative_definite_hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  VecT mappel::methods::objective::debug::llh_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  VecT mappel::methods::objective::debug::rllh_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  MatT mappel::methods::objective::debug::grad_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  CubeT mappel::methods::objective::debug::hessian_components (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta)
- template<class Model >
  void mappel::methods::aposteriori_objective (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::prior_objective (const Model &model, const ParamT< Model > &theta, double &rllh, ParamT< Model > &grad, MatT &hess)

- template<class Model >
  void mappel::methods::likelihood_objective (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::aposteriori_objective (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  void mappel::methods::likelihood_objective (const Model &model, const ModelDataT< Model > &data_im, const ParamT< Model > &theta, double &rllh, ParamT< Model > &grad, MatT &hess)
- template<class Model >
  ParamT< Model > mappel::methods::cr_lower_bound (const Model &model, const typename Model::Stencil &s)

  Calculate the Cramer-Rao lower bound at the given parameters.
- template<class Model >
  ParamT< Model > mappel::methods::cr_lower_bound (const Model &model, const ParamT< Model > &theta)
- template<class Model >
  MatT mappel::methods::expected_information (const Model &model, const ParamT< Model > &theta)
- template<class Model >
  MatT mappel::methods::observed_information (const Model &model, const ModelDataT< Model > &data, const StencilT< Model > &theta_mode)
- template<class Model >
  MatT mappel::methods::observed_information (const Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_mode)
- template<class Model >
  StencilT< Model > mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method)
- template<class Model >
  StencilT< Model > mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, double &rllh)
- template<class Model >
  void mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI)
- template<class Model >
  void mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI, StatsT &stats)
- template<class Model >
  void mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI)
- template<class Model >
  void mappel::methods::estimate_max (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, ParamT< Model > &theta_max, double &theta_max_llh, MatT &obsI, StatsT &stats)
- template<class Model >
  MatT mappel::methods::estimate_mcmc_sample (Model &model, const ModelDataT< Model > &data, IdxT Nsample=1000, IdxT Nburnin=100, IdxT thin=0)
- template<class Model >
  MatT mappel::methods::estimate_mcmc_sample (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample=1000, IdxT Nburnin=100, IdxT thin=0)
- template<class Model >
  void mappel::methods::estimate_mcmc_sample (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample, IdxT Nburnin, IdxT thin, MatT &sample, VecT &sample_rllh)

- template<class Model >
  void mappel::methods::estimate_mcmc_posterior (Model &model, const ModelDataT< Model > &data, IdxT Nsample, IdxT Nburnin, IdxT thin, ParamT< Model > &posterior_mean, MatT &posterior_cov)
- template<class Model >
  void mappel::methods::estimate_mcmc_posterior (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample, IdxT Nburnin, IdxT thin, ParamT< Model > &posterior_mean, MatT &posterior_cov)
- template<class Model >
  void mappel::methods::error_bounds_expected (const Model &model, const ParamT< Model > &theta_est, double confidence, ParamT< Model > &theta_lb, ParamT< Model > &theta_ub)
- template<class Model >
  void mappel::methods::error_bounds_observed (const Model &model, const ParamT< Model > &theta_est, MatT &obsI, double confidence, ParamT< Model > &theta_lb, ParamT< Model > &theta_ub)
- template<class Model >
  void mappel::methods::error_bounds_posterior_credible (const Model &model, const MatT &sample, double confidence, ParamT< Model > &theta_mean, ParamT< Model > &theta_lb, ParamT< Model > &theta_ub)
- template<class Model >
  void mappel::methods::debug::estimate_max_debug (Model &model, const ModelDataT< Model > &data, const std::string &method, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh, StatsT &stats)
- template<class Model >
  void mappel::methods::debug::estimate_max_debug (Model &model, const ModelDataT< Model > &data, const std::string &method, const ParamT< Model > &theta_init, ParamT< Model > &theta_est, double &rllh, MatT &obsI, MatT &sequence, VecT &sequence_rllh, StatsT &stats)
- template<class Model >
  void mappel::methods::debug::estimate_mcmc_sample_debug (Model &model, const ModelDataT< Model > &data, IdxT Nsample, MatT &sample, VecT &sample_rllh, MatT &candidates, VecT &candidates_rllh)
- template<class Model >
  void mappel::methods::debug::estimate_mcmc_sample_debug (Model &model, const ModelDataT< Model > &data, const ParamT< Model > &theta_init, IdxT Nsample, MatT &sample, VecT &sample_rllh, MatT &candidates, VecT &candidates_rllh)

9.53 numerical.cpp File Reference

Numerical matrix operations.

```
#include <cassert>
#include "Mappel/numerical.h"
```

Namespaces

- mappel

Functions

- void mappel::copy_Usym_mat (arma::mat &usym)
- void mappel::copy_Usym_mat_stack (arma::cube &usym_stack)
- void mappel::copy_Lsym_mat (arma::mat &lsym)
- void mappel::cholesky_make_negative_definite (arma::mat &m)
- void mappel::cholesky_make_positive_definite (arma::mat &m)
- bool mappel::is_negative_definite (const arma::mat &usym)
- bool mappel::is_positive_definite (const arma::mat &usym)
- bool mappel::is_symmetric (const arma::mat &A)
- void mappel::cholesky_convert_lower_triangular (arma::mat &chol)
- void mappel::cholesky_convert_full_matrix (arma::mat &chol)
- bool mappel::cholesky (arma::mat &A)
- bool mappel::modified_cholesky (arma::mat &A)
- arma::vec mappel::cholesky_solve (const arma::mat &C, const arma::vec &b)

9.53.1 Detailed Description

Numerical matrix operations.

Author

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

Date

05-2015

9.54 numerical.h File Reference

Numerical matrix operations.

```
#include <cmath>
#include <climits>
#include <armadillo>
#include "Mappel/util.h"
```

Namespaces

- mappel

Functions

- void mappel::copy_Usym_mat (arma::mat &usym)
- void mappel::copy_Usym_mat_stack (arma::cube &usym_stack)
- void mappel::copy_Lsym_mat (arma::mat &lsym)
- void mappel::cholesky_convert_lower_triangular (arma::mat &chol)
- void mappel::cholesky_convert_full_matrix (arma::mat &chol)
- void mappel::cholesky_make_negative_definite (arma::mat &m)
- void mappel::cholesky_make_positive_definite (arma::mat &m)
- bool mappel::is_positive_definite (const arma::mat &usym)
- bool mappel::is_negative_definite (const arma::mat &usym)
- bool mappel::is_symmetric (const arma::mat &A)
- bool mappel::cholesky (arma::mat &A)
- bool mappel::modified_cholesky (arma::mat &A)
- arma::vec mappel::cholesky_solve (const arma::mat &C, const arma::vec &b)

9.54.1 Detailed Description

Numerical matrix operations.

Author

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

Date

05-22-2015

9.55 OMPExceptionCatcher.h File Reference

A lightweight class for managing C++ exception handling strategies for openMP methods.

```
#include <exception>
#include <mutex>
#include <functional>
#include <cstdint>
```

Classes

- class omp_exception_catcher::impl_::OMPExceptionCatcher< IntType >

Namespaces

- omp_exception_catcher
- omp_exception_catcher::impl_

Typedefs

- using omp_exception_catcher::OMPExceptionCatcher = impl_::OMPExceptionCatcher< uint32_t >

9.55.1 Detailed Description

A lightweight class for managing C++ exception handling strategies for openMP methods.

Author

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

Date

2019 OpenMP code must catch any exceptions that may have been thrown before exiting the OpenMP block. This class acts as lightweight wrapper that allows an arbitrary function or lambda expression to be run safely and efficiently in OMP even if it might throw exceptions. We employ one of 4 possible strategies as determined By the OMPExceptionCatcher::Strategies enum.

Strategy's : OMPExceptionCatcher::Strategies::DoNotTry – Don't even try, this is a null op to completely disable this class's effect. OMPExceptionCatcher::Strategies::Continue – Catch exceptions and keep going OMPException↩ Catcher::Strategies::Abort – Catch exceptions and abort OMPExceptionCatcher::Strategies::RethrowFirst – Re-throws first exception thrown by any thread

Example useage: OMPExceptionCatcher catcher(OMPExceptionCatcher<>::Strategies::Continue); #pragma omp parallel for for(int n=0; n < N; n++) catcher.run([&]{ my_ouput(n)=do_my calulations(args(n)); } catcher.rethrow(); //Required only if you ever might use RethrowFirst strategy

9.56 openmp_methods.h File Reference

Namespaces for OpenMP parallelized versions of the mappel::model namespace functions (external methods)

```
#include <omp.h>
#include "Mappel/util.h"
#include "Mappel/mcmc.h"
```

Namespaces

- mappel
- mappel::methods

  Templated functions for operating on a PointEmitterModel.
- mappel::methods::openmp
- mappel::methods::objective
- mappel::methods::objective::openmp

Functions

- template<class Model >
  void mappel::methods::openmp::sample_prior_stack (Model &model, ParamVecT< Model > &theta_stack)

  Parallel sampling of the model prior.
- template<class Model >
  void mappel::methods::openmp::model_image_stack (const Model &model, const ParamVecT< Model > &theta_stack, ImageStackT< Model > &image_stack)

  Parallel computation of the model image.
- template<class Model >
  void mappel::methods::openmp::simulate_image_stack (Model &model, const ParamVecT< Model > &theta_↩ stack, ImageStackT< Model > &image_stack)

  Parallel simulation of images from one or more theta.
- template<class Model >
  void mappel::methods::openmp::cr_lower_bound_stack (const Model &model, const ParamVecT< Model > &theta_stack, ParamVecT< Model > &crlb_stack)
- template<class Model >
  void mappel::methods::openmp::expected_information_stack (const Model &model, const ParamVecT< Model > &theta_stack, CubeT &fisherI_stack)
- template<class Model >
  void mappel::methods::openmp::estimate_max_stack (Model &model, const ModelDataStackT< Model > &data_stack, const std::string &method, ParamVecT< Model > &theta_max_stack, VecT &theta_max_rllh, CubeT &obsI_stack)
- template<class Model >
  void mappel::methods::openmp::estimate_max_stack (Model &model, const ModelDataStackT< Model > &data_stack, const std::string &method, ParamVecT< Model > &theta_max_stack, VecT &theta_max_rllh, CubeT &obsI_stack, StatsT &stats)
- template<class Model >
  void mappel::methods::openmp::estimate_max_stack (Model &model, const ModelDataStackT< Model > &data_stack, const std::string &method, ParamVecT< Model > &theta_init_stack, ParamVecT< Model > &theta_max_stack, VecT &theta_max_rllh, CubeT &obsI_stack)
- template<class Model >
  void mappel::methods::openmp::estimate_max_stack (Model &model, const ModelDataStackT< Model > &data_stack, const std::string &method, ParamVecT< Model > &theta_init_stack, ParamVecT< Model > &theta_max_stack, VecT &theta_max_rllh, CubeT &obsI_stack, StatsT &stats)
- template<class Model >
  void mappel::methods::openmp::estimate_profile_likelihood (Model &model, const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &fixed_values, const std::string &method, VecT &profile_likelihood, ParamVecT< Model > &profile_parameters)
- template<class Model >
  void mappel::methods::openmp::estimate_profile_likelihood (Model &model, const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &fixed_values, const std::string &method, VecT &profile_likelihood, ParamVecT< Model > &profile_parameters, StatsT &stats)
- template<class Model >
  void mappel::methods::openmp::estimate_profile_likelihood (Model &model, const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &fixed_values, const std::string &method, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_parameters)
- template<class Model >
  void mappel::methods::openmp::estimate_profile_likelihood (Model &model, const ModelDataT< Model > &data, const IdxVecT &fixed_parameters, const MatT &fixed_values, const std::string &method, const ParamVecT< Model > &theta_init, VecT &profile_likelihood, ParamVecT< Model > &profile_parameters, StatsT &stats)

- template<class Model >
  void mappel::methods::openmp::estimate_mcmc_sample_stack (Model &model, const ModelDataStackT< Model > &data_stack, const ParamVecT< Model > &theta_init_stack, IdxT Nsamples, IdxT Nburnin, IdxT thin, CubeT &sample_stack, MatT &sample_rllh_stack)
- template<class Model >
  void mappel::methods::openmp::estimate_mcmc_sample_stack (Model &model, const ModelDataStackT< Model > &data_stack, IdxT Nsamples, IdxT Nburnin, IdxT thin, CubeT &sample, MatT &sample_rllh)
- template<class Model >
  void mappel::methods::openmp::estimate_mcmc_posterior_stack (Model &model, const ModelDataStackT< Model > &data_stack, const ParamVecT< Model > &theta_init_stack, IdxT Nsamples, IdxT Nburnin, IdxT thin, MatT &theta_mean_stack, CubeT &theta_cov_stack)
- template<class Model >
  void mappel::methods::openmp::estimate_mcmc_posterior_stack (Model &model, const ModelDataStackT< Model > &data_stack, IdxT Nsamples, IdxT Nburnin, IdxT thin, MatT &theta_mean_stack, CubeT &theta_cov↩_stack)
- template<class Model >
  void mappel::methods::openmp::error_bounds_expected_stack (const Model &model, const MatT &theta_est_↩stack, double confidence, MatT &theta_lb_stack, MatT &theta_ub_stack)
- template<class Model >
  void mappel::methods::openmp::error_bounds_observed_stack (const Model &model, const MatT &theta_est_↩stack, CubeT &obsI_stack, double confidence, MatT &theta_lb_stack, MatT &theta_ub_stack)
- template<class Model >
  void mappel::methods::openmp::error_bounds_posterior_credible_stack (const Model &model, const CubeT &sample_stack, double confidence, MatT &theta_mean_stack, MatT &theta_lb_stack, MatT &theta_ub_stack)
- template<class Model >
  void mappel::methods::objective::openmp::llh_stack (const Model &model, const ImageT< Model > &image, const ParamVecT< Model > &theta_stack, VecT &llh_stack)

  Parallel log_likelihood calculations for a single image.
- template<class Model >
  void mappel::methods::objective::openmp::llh_stack (const Model &model, const ImageStackT< Model > &image_stack, const ParamVecT< Model > &theta_stack, VecT &llh_stack)

  Parallel log_likelihood calculations for a stack of images.
- template<class Model >
  void mappel::methods::objective::openmp::rllh_stack (const Model &model, const ImageStackT< Model > &image_stack, const ParamVecT< Model > &theta_stack, VecT &rllh_stack)

  Parallel relative log_likelihood calculations for a stack of images.
- template<class Model >
  void mappel::methods::objective::openmp::rllh_stack (const Model &model, const ImageT< Model > &image, const ParamVecT< Model > &theta_stack, VecT &rllh_stack)
- template<class Model >
  void mappel::methods::objective::openmp::grad_stack (const Model &model, const ImageStackT< Model > &image_stack, const ParamVecT< Model > &theta_stack, ParamVecT< Model > &grad_stack)

  Parallel model gradient calculations for a stack of images.
- template<class Model >
  void mappel::methods::objective::openmp::hessian_stack (const Model &model, const ImageStackT< Model > &image_stack, const ParamVecT< Model > &theta_stack, CubeT &hessian_stack)

  Parallel model Hessian calculations for a stack of images.
- template<class Model >
  void mappel::methods::objective::openmp::negative_definite_hessian_stack (const Model &model, const Image↩StackT< Model > &image_stack, const ParamVecT< Model > &theta_stack, CubeT &hessian_stack)

  Parallel model negative_definite Hessian approximation calculations for a stack of images.

9.56.1 Detailed Description

Namespaces for OpenMP parallelized versions of the mappel::model namespace functions (external methods)

Author

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

Date

2013-2019 OpenMP computation for stacked Model operations on vector data.

Design Decisions

- OpenMP vectorized versions are implemented as templated external methods in inline namespaces openmp. This allows easy future replacement with other palatalization mechanisms (CUDA, C++11 threads, etc..). Also allows the vectorized versions to directly overload with the non-vectorized base-versions.
- Because we want to integrate as seamlessly as possible with matlab, we use the armadillo package which stores arrays in column major order.
- Therefore in the $*$_stack operations, if they are to be parallelized, we want the data stored as a nParms X n matrix, i.e. each column is a parameter matrix. Similarly stacks are size X size X n, so that contiguous images sequences are contiguous in memory. This avoids false sharing.

9.57 PointEmitterModel.cpp File Reference

The class definition and template Specializations for PointEmitterModel.

```
#include <cmath>
#include <algorithm>
#include "Mappel/PointEmitterModel.h"
```

Namespaces

- mappel

9.57.1 Detailed Description

The class definition and template Specializations for PointEmitterModel.

Author

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

Date

03-13-2014

9.58 PointEmitterModel.h File Reference

The class declaration and inline and templated functions for PointEmitterModel.

```
#include <iostream>
#include <string>
#include <armadillo>
#include <PriorHessian/CompositeDist.h>
#include <PriorHessian/TruncatedNormalDist.h>
#include <PriorHessian/ScaledSymmetricBetaDist.h>
#include <PriorHessian/TruncatedGammaDist.h>
#include <PriorHessian/TruncatedParetoDist.h>
#include "Mappel/util.h"
#include "Mappel/stencil.h"
#include "Mappel/display.h"
#include "Mappel/rng.h"
```

Classes

- class mappel::PointEmitterModel

  A virtual Base type for point emitter localization models.

Namespaces

- mappel

Functions

- template<class Model , typename = EnableIfSubclassT<Model,PointEmitterModel>>
  std::ostream & mappel::operator<< (std::ostream &out, const Model &model)

9.58.1 Detailed Description

The class declaration and inline and templated functions for PointEmitterModel.

Author

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

Date

03-13-2014 The base class for all point emitter localization models

9.59 PoissonGaussianNoise2DObjective.cpp File Reference

```
#include "Mappel/PoissonGaussianNoise2DObjective.h"
```

Namespaces

- mappel

9.60 PoissonGaussianNoise2DObjective.h File Reference

The class declaration and inline and templated functions for PoissonGaussianNoise2DObjective.

```
#include "Mappel/PoissonNoise2D.h"
```

Classes

- class PoissonGaussianNoise2DObjective< ModelBase >

  A Base type for point emitter localization models that use 2d images.

Functions

- template<class Model >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value, typename Model::ImageT >::type model_image (const Model &model, const typename Model::Stencil &s)
- template<class Model , class rng_t >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value, typename Model::ImageT >::type simulate_image (const Model &model, const typename Model::Stencil &s, rng_t &rng)

  Simulate an image using the PSF model, by generating Poisson noise.
- template<class Model , class rng_t >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value, typename Model::ImageT >::type simulate_image (const Model &model, const typename Model::ImageT &model_im, rng_t &rng)
- template<class Model >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value >::type model_grad (const Model &model, const typename Model::ImageT &im, const typename Model::Stencil &s, typename Model::↩ ParamT &grad)
- template<class Model >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value >::type model_grad2 (const Model &model, const typename Model::ImageT &im, const typename Model::Stencil &s, typename Model::ParamT &grad, typename Model::ParamT &grad2)
- template<class Model >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value >::type model_hessian (const Model &model, const typename Model::ImageT &im, const typename Model::Stencil &s, typename Model::ParamT &grad, typename Model::MatT &hess)

- template<class Model >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value, double >::type log_likelihood (const Model &model, const typename Model::ImageT &data_im, const typename Model::Stencil &s)
- template<class Model >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value, double >::type relative_log_likelihood (const Model &model, const typename Model::ImageT &data_im, const typename Model::Stencil &s)
- template<class Model >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value, typename Model::MatT >::type fisher_information (const Model &model, const typename Model::Stencil &s)
- template<class Model >
  std::enable_if< std::is_base_of< PoissonGaussianNoise2DObjective, Model >::value, std::shared_ptr< Estimator< Model > > >::type make_estimator (const Model &model, std::string ename)

9.60.1 Detailed Description

The class declaration and inline and templated functions for PoissonGaussianNoise2DObjective.

Author

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

Date

04-2017

9.60.2 Function Documentation

9.60.2.1 template<class Model > std::enable_if<std::is_base_of<PoissonGaussianNoise2DObjective,Model>::value,typename Model::MatT>::type fisher_information (const Model & *model,* const typename Model::Stencil & *s*)

Definition at line 200 of file PoissonGaussianNoise2DObjective.h.

Referenced by mappel::fisher_information_stack().

9.60.2.2 template<class Model > std::enable_if<std::is_base_of<PoissonGaussianNoise2DObjective,Model>::value,double>::type log_likelihood (const Model & *model,* const typename Model::ImageT & *data_im,* const typename Model::Stencil & *s*)

Definition at line 172 of file PoissonGaussianNoise2DObjective.h.

References mappel::methods::objective::llh(), and mappel::poisson_log_likelihood().

Referenced by mappel::log_likelihood_stack().

9.60.2.3 template<class Model > std::enable_if<std::is_base_of<PoissonGaussianNoise2DObjective,Model>::value,std::shared_ptr<Estimator<Model> > >::type make_estimator (const Model & *model,* std::string *ename*)

Definition at line 217 of file PoissonGaussianNoise2DObjective.h.

References mappel::istarts_with().

9.60.2.4 template<class Model > std::enable_if<std::is_base_of<PoissonGaussianNoise2DObjective,Model>::value>::type model_grad (const Model & *model,* const typename Model::ImageT & *im,* const typename Model::Stencil & *s,* typename Model::ParamT & *grad*)

Definition at line 101 of file PoissonGaussianNoise2DObjective.h.

Referenced by mappel::model_grad_stack().

9.60.2.5 template<class Model > std::enable_if<std::is_base_of<PoissonGaussianNoise2DObjective,Model>::value>::type model_grad2 (const Model & *model,* const typename Model::ImageT & *im,* const typename Model::Stencil & *s,* typename Model::ParamT & *grad,* typename Model::ParamT & *grad2*)

Definition at line 119 of file PoissonGaussianNoise2DObjective.h.

9.60.2.6 template<class Model > std::enable_if<std::is_base_of<PoissonGaussianNoise2DObjective,Model>::value>::type model_hessian (const Model & *model,* const typename Model::ImageT & *im,* const typename Model::Stencil & *s,* typename Model::ParamT & *grad,* typename Model::MatT & *hess*)

Definition at line 148 of file PoissonGaussianNoise2DObjective.h.

Referenced by mappel::model_hessian_stack().

9.60.2.7 template<class Model > std::enable_if<std::is_base_of<PoissonGaussianNoise2DObjective,Model>::value,typename Model::ImageT>::type model_image (const Model & *model,* const typename Model::Stencil & *s*)

Definition at line 59 of file PoissonGaussianNoise2DObjective.h.

Referenced by mappel::model_image_stack(), and mappel::simulate_image_stack().

9.60.2.8 template<class Model > std::enable_if<std::is_base_of<PoissonGaussianNoise2DObjective,Model>::value,double>::type relative_log_likelihood (const Model & *model,* const typename Model::ImageT & *data_im,* const typename Model::Stencil & *s*)

Definition at line 185 of file PoissonGaussianNoise2DObjective.h.

References mappel::relative_poisson_log_likelihood(), and mappel::methods::objective::rllh().

9.60.2.9 template<class Model , class rng_t > std::enable_if<std::is_base_of<PoissonGaussianNoise2DObjective,Model>::value,typename Model::ImageT>::type simulate_image (const Model & *model,* const typename Model::Stencil & *s,* rng_t & *rng*)

Simulate an image using the PSF model, by generating Poisson noise.

Parameters

out	*image*	An image to populate.
in	*theta*	The parameter values to us
in,out	*rng*	An initialized random number generator

Definition at line 78 of file PoissonGaussianNoise2DObjective.h.

References mappel::generate_poisson().

9.60.2.10 template<class Model , class rng_t > std::enable_if<std::is_base_of<PoissonGaussianNoise2D↩ Objective,Model>::value,typename Model::ImageT>::type simulate_image (const Model & *model,* const typename Model::ImageT & *model_im,* rng_t & *rng*)

Definition at line 89 of file PoissonGaussianNoise2DObjective.h.

References mappel::generate_poisson().

9.61 PoissonNoise1DObjective.cpp File Reference

The class definition and template Specializations for PoissonNoise1DObjective.

```
#include "Mappel/PoissonNoise1DObjective.h"
```

Namespaces

- mappel

9.61.1 Detailed Description

The class definition and template Specializations for PoissonNoise1DObjective.

Author

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

Date

2014-2019

9.62 PoissonNoise1DObjective.h File Reference

The class declaration and inline and templated functions for PoissonNoise1DObjective.

```
#include "Mappel/ImageFormat1DBase.h"
#include "Mappel/PoissonNoise2DObjective.h"
#include "Mappel/estimator.h"
```

Classes

- class mappel::PoissonNoise1DObjective

  A base class for 1D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel.

Namespaces

- mappel
- mappel::methods

  Templated functions for operating on a PointEmitterModel.
- mappel::methods::likelihood
- mappel::methods::likelihood::debug

Functions

- template<class Model , class rng_t >
  ReturnIfSubclassT< ModelDataT< Model >, Model, PoissonNoise1DObjective > mappel::methods::simulate_image (const Model &model, const StencilT< Model > &s, rng_t &rng)

  Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise1DObjective.
- template<class Model , class rng_t >
  ReturnIfSubclassT< ModelDataT< Model >, Model, PoissonNoise1DObjective > mappel::methods::simulate_image_from_model (const Model &model, const ImageT< Model > &model_im, rng_t &rng)

  Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise1DObjective.
- template<class Model >
  ReturnIfSubclassT< MatT, Model, PoissonNoise1DObjective > mappel::methods::expected_information (const Model &model, const StencilT< Model > &s)

  Compute the expected information (Fisher information at theta). Note: Expected information is an average quantity and is independent of the data. Enabled for PoissonNoise1DObjective.
- template<class Model >
  ReturnIfSubclassT< std::unique_ptr< Estimator< Model > >, Model, PoissonNoise1DObjective > mappel::methods::make_estimator (Model &model, std::string ename)
- template<class Model >
  ReturnIfSubclassT< double, Model, PoissonNoise1DObjective > mappel::methods::likelihood::llh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< double, Model, PoissonNoise1DObjective > mappel::methods::likelihood::rllh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)

- template<class Model >
  ReturnIfSubclassT< ParamT< Model >, Model, PoissonNoise1DObjective > mappel::methods::likelihood::grad (const Model &model, const ModelDataT< Model > &im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< void, Model, PoissonNoise1DObjective > mappel::methods::likelihood::grad2 (const Model &model, const ModelDataT< Model > &im, const StencilT< Model > &s, ParamT< Model > &grad_val, ParamT< Model > &grad2_val)
- template<class Model >
  ReturnIfSubclassT< void, Model, PoissonNoise1DObjective > mappel::methods::likelihood::hessian (const Model &model, const ModelDataT< Model > &im, const StencilT< Model > &s, ParamT< Model > &grad_val, MatT &hess_val)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, PoissonNoise1DObjective > mappel::methods::likelihood::debug::llh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, PoissonNoise1DObjective > mappel::methods::likelihood::debug::rllh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< MatT, Model, PoissonNoise1DObjective > mappel::methods::likelihood::debug::grad_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< CubeT, Model, PoissonNoise1DObjective > mappel::methods::likelihood::debug::hessian_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)

9.62.1 Detailed Description

The class declaration and inline and templated functions for PoissonNoise1DObjective.

Author

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

Date

2014-2019

9.63 PoissonNoise2DObjective.cpp File Reference

The class definition and template Specializations for PoissonNoise2DObjective.

```
#include "Mappel/PoissonNoise2DObjective.h"
```

Namespaces

- mappel

9.63.1 Detailed Description

The class definition and template Specializations for PoissonNoise2DObjective.

Author

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

Date

2014-2019

9.64 PoissonNoise2DObjective.h File Reference

The class declaration and inline and templated functions for PoissonNoise2DObjective.

```
#include "Mappel/ImageFormat2DBase.h"
#include "Mappel/estimator.h"
```

Classes

- class mappel::PoissonNoise2DObjective

  A base class for 2D objectives with Poisson read noise. This objective function and its subclasses are for models where the only source of noise is the "shot" or "counting" or Poisson noise inherent to a discrete capture of phontons given a certain mean rate of incidence on each pixel.

Namespaces

- mappel
- mappel::methods

  Templated functions for operating on a PointEmitterModel.
- mappel::methods::likelihood
- mappel::methods::likelihood::debug

Functions

- template<class Model , class rng_t >
  ReturnIfSubclassT< ImageT< Model >, Model, PoissonNoise2DObjective > mappel::methods::simulate_image (const Model &model, const StencilT< Model > &s, rng_t &rng)

  Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise2DObjective.
- template<class Model , class rng_t >
  ReturnIfSubclassT< ImageT< Model >, Model, PoissonNoise2DObjective > mappel::methods::simulate_image_from_model (const Model &model, const ImageT< Model > &model_im, rng_t &rng)

  Simulate an image at a given theta stencil, by generating Poisson noise Enabled for PoissonNoise2DObjective.
- template<class Model >
  ReturnIfSubclassT< MatT, Model, PoissonNoise2DObjective > mappel::methods::expected_information (const Model &model, const StencilT< Model > &s)

  Compute the expected information (Fisher information at theta). Note: Expected information is an average quantity and is independent of the data. Enabled for PoissonNoise2DObjective.
- template<class Model >
  ReturnIfSubclassT< std::unique_ptr< Estimator< Model > >, Model, PoissonNoise2DObjective > mappel::methods::make_estimator (Model &model, std::string ename)
- template<class Model >
  ReturnIfSubclassT< double, Model, PoissonNoise2DObjective > mappel::methods::likelihood::llh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< double, Model, PoissonNoise2DObjective > mappel::methods::likelihood::rllh (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< ParamT< Model >, Model, PoissonNoise2DObjective > mappel::methods::likelihood::grad (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< void, Model, PoissonNoise2DObjective > mappel::methods::likelihood::grad2 (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad_val, ParamT< Model > &grad2_val)
- template<class Model >
  ReturnIfSubclassT< void, Model, PoissonNoise2DObjective > mappel::methods::likelihood::hessian (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s, ParamT< Model > &grad_val, MatT &hess_val)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, PoissonNoise2DObjective > mappel::methods::likelihood::debug::llh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< VecT, Model, PoissonNoise2DObjective > mappel::methods::likelihood::debug::rllh_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< MatT, Model, PoissonNoise2DObjective > mappel::methods::likelihood::debug::grad_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)
- template<class Model >
  ReturnIfSubclassT< CubeT, Model, PoissonNoise2DObjective > mappel::methods::likelihood::debug::hessian_components (const Model &model, const ModelDataT< Model > &data_im, const StencilT< Model > &s)

9.64.1 Detailed Description

The class declaration and inline and templated functions for PoissonNoise2DObjective.

Author

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

Date

2014-2019

9.65 PriorMAP1DObjective.h File Reference

The class declaration and inline and templated functions for PriorMAP1DObjective.

```
#include <armadillo>
#include "Mappel/stencil.h"
```

Classes

- class mappel::PriorMAP1DObjective

  A Mixin class to configure a Gauss1DModel for MAP estimation (default 1D prior).

Namespaces

- mappel

9.65.1 Detailed Description

The class declaration and inline and templated functions for PriorMAP1DObjective.

Author

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

Date

03-22-2014

9.66 README.md File Reference

9.67 rng.cpp File Reference

```
#include "Mappel/rng.h"
```

Namespaces

- mappel

Variables

- ParallelRngManagerT mappel::rng_manager

9.68 rng.h File Reference

Random number generation usign sfmt.

```
#include <random>
#include "Mappel/util.h"
#include <trng/lcg64_shift.hpp>
#include <ParallelRngManager/ParallelRngManager.h>
```

Namespaces

- mappel

Typedefs

- using mappel::ParallelRngGeneratorT = trng::lcg64_shift
- using mappel::ParallelRngManagerT = parallel_rng::ParallelRngManager< ParallelRngGeneratorT >
- using mappel::RngSeedT = parallel_rng::SeedT
- using mappel::UniformDistT = std::uniform_real_distribution< double >

Functions

- template<class RngT >
  IdxT mappel::generate_poisson_small (RngT &rng, double mu)

  Genrates a single poisson disributed int from distribution with mean mu.
- template<class RngT >
  IdxT mappel::generate_poisson_large (RngT &rng, double mu)
- template<class RngT >
  double mappel::generate_poisson (RngT &rng, double mu)

9.68.1 Detailed Description

Random number generation usign sfmt.

Author

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

Date

12-12-2013

9.69 stackcomp.h File Reference

Data-parallel versions of core computational functions using OpenMP.

```
#include <omp.h>
#include "Mappel/rng.h"
```

Namespaces

- mappel

Functions

- template<class Model >
  void mappel::sample_prior_stack (Model &model, typename Model::ParamVecT &theta_stack)

  Parallel sampling of the model prior.
- template<class Model >
  void mappel::model_image_stack (const Model &model, const typename Model::ParamVecT &theta_stack, typename Model::ImageStackT &image_stack)

  Parallel computation of the model image.
- template<class Model >
  void mappel::simulate_image_stack (const Model &model, const typename Model::ParamVecT &theta_stack, typename Model::ImageStackT &image_stack)

  Parallel simulation of images from one or more theta.
- template<class Model >
  void mappel::log_likelihood_stack (const Model &model, const typename Model::ImageT &image, const typename Model::ParamVecT &theta_stack, VecT &llh_stack)

  Parallel log_likelihood calculations for a single image.
- template<class Model >
  void mappel::log_likelihood_stack (const Model &model, const typename Model::ImageStackT &image_stack, const typename Model::ParamVecT &theta_stack, VecT &llh_stack)

  Parallel log_likelihood calculations for a stack of images.
- template<class Model >
  void mappel::model_grad_stack (const Model &model, const typename Model::ImageStackT &image_stack, const typename Model::ParamVecT &theta_stack, typename Model::ParamVecT &grad_stack)

  Parallel model gradient calculations for a stack of images.
- template<class Model >
  void mappel::model_hessian_stack (const Model &model, const typename Model::ImageStackT &image_stack, const typename Model::ParamVecT &theta_stack, CubeT &hessian_stack)

  Parallel model Hessian calculations for a stack of images.
- template<class Model >
  void mappel::model_positive_hessian_stack (const Model &model, const typename Model::ImageStackT &image_stack, const typename Model::ParamVecT &theta_stack, CubeT &hessian_stack)

  Parallel model positive-definite Hessian approximation calculations for a stack of images.
- template<class Model >
  void mappel::cr_lower_bound_stack (const Model &model, const typename Model::ParamVecT &theta_stack, typename Model::ParamVecT &crlb_stack)
- template<class Model >
  void mappel::fisher_information_stack (const Model &model, const typename Model::ParamVecT &theta_stack, CubeT &fisherI_stack)

9.69.1 Detailed Description

Data-parallel versions of core computational functions using OpenMP.

Author

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

Date

2013-2017 OpenMP computation for stacked Model operations on verctor data.

- Design Decisions
- Because we want to integrate as seamlessly as possible with matlab, we use the armadillo package which stores arrays in column major order.
- Therefore in the *_stack operations, if they are to be parallelized, we want the data stored as a nParms X n matrix, i.e. each column is a parameter matrix. Simillarly stacks are size X size X n, so that contiguous images sequences are contiguous in memory. This avoids false sharing.

9.70 stencil.cpp File Reference

The stencils for pixel based computations.

```
#include <sstream>
#include "Mappel/util.h"
#include "Mappel/stencil.h"
#include "Mappel/display.h"
```

Namespaces

- mappel

Functions

- double mappel::normal_quantile_twosided (double confidence)
- double mappel::normal_quantile_onesided (double confidence)
- void mappel::fill_gaussian_stencil (int size, double stencil[ ], double sigma)
- double mappel::gaussian_convolution (int x, int y, const MatT &data, const VecT &Xstencil, const VecT &Ystencil)
- void mappel::estimate_gaussian_2Dmax (const MatT &data, const VecT &Xstencil, const VecT &Ystencil, int max_pos[ ], double &min_val)
- void mappel::refine_gaussian_2Dmax (const MatT &data, const VecT &Xstencil, const VecT &Ystencil, int max↩ _pos[ ])
- double mappel::gaussian_3D_convolution (int x, int y, int z, const CubeT &data, const VecFieldT &stencils)
- void mappel::estimate_gaussian_3Dmax (const CubeT &data, const VecFieldT &stencils, int max_pos[ ], double &min_val)
- void mappel::refine_gaussian_3Dmax (const CubeT &data, const VecFieldT &stencils, int max_pos[ ])
- double mappel::estimate_background (const MatT &im, const MatT &unit_model_im, double min_bg)
- double mappel::estimate_intensity (const MatT &im, const MatT &unit_model_im, double bg)
- double mappel::estimate_background (const CubeT &im, const CubeT &unit_model_im)
- double mappel::estimate_intensity (const CubeT &im, const CubeT &unit_model_im, double bg)

9.70.1 Detailed Description

The stencils for pixel based computations.

Author

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

Date

03-22-2014

9.71 stencil.h File Reference

The stencils for pixel based computations.

```
#include <cmath>
#include <climits>
#include "Mappel/util.h"
#include "Mappel/rng.h"
```

Namespaces

- mappel

Functions

- double mappel::gauss_norm (double sigma)
- void mappel::fill_d_stencil (int size, double stencil[ ], double theta_x)
- void mappel::fill_G_stencil (int size, double stencil[ ], const double dx[ ], double theta_sigma)
- void mappel::fill_X_stencil (int size, double stencil[ ], const double dx[ ], double theta_sigma)
- void mappel::fill_DX_stencil (int size, double stencil[ ], const double Gx[ ], double theta_sigma)
- void mappel::fill_DXS_stencil (int size, double stencil[ ], const double dx[ ], const double Gx[ ], double theta_sigma)
- void mappel::fill_DXS2_stencil (int size, double stencil[ ], const double dx[ ], const double Gx[ ], const double D↩ XS[ ], double theta_sigma)
- void mappel::fill_DXSX_stencil (int size, double stencil[ ], const double dx[ ], const double Gx[ ], const double DX[ ], double theta_sigma)
- VecT mappel::make_d_stencil (int size, double theta_x)
- VecT mappel::make_G_stencil (int size, const VecT &dx, double theta_sigma)
- VecT mappel::make_X_stencil (int size, const VecT &dx, double theta_sigma)
- VecT mappel::make_DX_stencil (int size, const VecT &Gx, double theta_sigma)
- VecT mappel::make_DXS_stencil (int size, const VecT &dx, const VecT &Gx, double theta_sigma)
- VecT mappel::make_DXS2_stencil (int size, const VecT &dx, const VecT &Gx, const VecT &DXS, double theta↩ _sigma)
- VecT mappel::make_DXSX_stencil (int size, const VecT &dx, const VecT &Gx, const VecT &DX, double theta_↩ sigma)
- void mappel::fill_gaussian_stencil (int size, double stencil[ ], double sigma)

- VecT mappel::make_gaussian_stencil (int size, double sigma)
- void mappel::estimate_gaussian_2Dmax (const MatT &data, const VecT &Xstencil, const VecT &Ystencil, int max_pos[ ], double &min_val)
- void mappel::refine_gaussian_2Dmax (const MatT &data, const VecT &Xstencil, const VecT &Ystencil, int max_pos[ ])
- double mappel::gaussian_convolution (int x, int y, const MatT &data, const VecT &Xstencil, const VecT &Ystencil)
- void mappel::estimate_gaussian_3Dmax (const CubeT &data, const VecFieldT &stencils, int max_pos[ ], double &min_val)
- void mappel::refine_gaussian_3Dmax (const CubeT &data, const VecFieldT &stencils, int max_pos[ ])
- double mappel::gaussian_3D_convolution (int x, int y, int z, const CubeT &data, const VecFieldT &stencils)
- double mappel::poisson_log_likelihood (double model_val, double data_val)
- double mappel::relative_poisson_log_likelihood (double model_val, double data_val)
- double mappel::check_lower_bound_hyperparameter (const char *name, double value, double lower_bound)
- double mappel::check_positive_hyperparameter (const char *name, double value, double hyperprior_epsilon=1E-6)
- double mappel::check_unit_hyperparameter (const char *name, double value, double hyperprior_epsilon=1E-6)
- double mappel::log_prior_beta_const (double beta)
- double mappel::log_prior_beta2_const (double beta0, double beta1)
- double mappel::log_prior_gamma_const (double kappa, double mean)
- double mappel::log_prior_pareto_const (double alpha, double min)
- double mappel::log_prior_normal_const (double sigma)
- double mappel::rllh_beta_prior (double beta, double v, double max=1., double min=0.)
- double mappel::rllh_beta2_prior (double beta0, double beta1, double v, double max=1., double min=0.)
- double mappel::rllh_gamma_prior (double kappa, double mean, double v)
- double mappel::rllh_pareto_prior (double alpha, double v)
- double mappel::rllh_normal_prior (double mu, double sigma)
- double mappel::beta_prior_grad (double beta, double v, double max=1., double min=0.)
- double mappel::beta2_prior_grad (double beta0, double beta1, double v, double max=1., double min=0.)
- double mappel::gamma_prior_grad (double kappa, double mean, double v)
- double mappel::pareto_prior_grad (double alpha, double v)
- double mappel::normal_prior_grad (double mu, double sigma)
- double mappel::beta_prior_grad2 (double beta, double v, double max=1., double min=0.)
- double mappel::beta2_prior_grad2 (double beta0, double beta1, double v, double max=1., double min=0.)
- double mappel::gamma_prior_grad2 (double kappa, double v)
- double mappel::pareto_prior_grad2 (double alpha, double v)
- double mappel::normal_prior_grad (double sigma)
- double mappel::normal_quantile_twosided (double confidence)
- double mappel::normal_quantile_onesided (double confidence)
- double mappel::rllh_normal_prior (double mu, double sigma, double v)
- double mappel::normal_prior_grad (double mu, double sigma, double v)
- double mappel::normal_prior_grad2 (double sigma)

9.71.1 Detailed Description

The stencils for pixel based computations.

Author

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

Date

03-22-2014

9.72 util.cpp File Reference

```
#include <sched.h>
#include <cctype>
#include <omp.h>
#include "Mappel/util.h"
```

Namespaces

- mappel

Functions

- void mappel::enable_all_cpus ()
- bool mappel::istarts_with (const char *s, const char *pattern)
- bool mappel::istarts_with (const std::string &str, const char *pattern)
- const char * mappel::icontains (const char *s, const char *pattern)
- int mappel::maxidx (const VecT &v)
- std::ostream & mappel::operator<< (std::ostream &out, const StatsT &stats)

9.73 util.h File Reference

```
#include <cstdint>
#include <cmath>
#include <memory>
#include <utility>
#include <string>
#include <map>
#include <sstream>
#include <armadillo>
#include <BacktraceException/BacktraceException.h>
```

Classes

- struct mappel::ParameterValueError
  Parameter value is not valid.
- struct mappel::ArrayShapeError
  Array is not of the right dimensionality.
- struct mappel::ArraySizeError
  Array is not of the right size.
- struct mappel::ModelBoundsError
  Access outside the model bounds is attempted.
- struct mappel::NumericalError
  Expected numerical condition does not hold.
- struct mappel::LogicalError
  Failure of code or algorithm logic.
- struct mappel::NotImplementedError
  Feature not yet implemented.

Namespaces

- mappel

Typedefs

- using mappel::BoolT = uint16_t
- using mappel::BoolVecT = arma::Col< uint16_t >
- using mappel::IdxT = arma::uword
- using mappel::IdxVecT = arma::Col< IdxT >
- using mappel::IdxMatT = arma::Mat< IdxT >
- using mappel::VecT = arma::vec
- using mappel::MatT = arma::mat
- using mappel::CubeT = arma::cube
- using mappel::VecFieldT = arma::field< VecT >
- using mappel::StatsT = std::map< std::string, double >
- using mappel::StringVecT = std::vector< std::string >
- template<class ModelT , class ModelBaseT >
  using mappel::EnableIfSubclassT = typename std::enable_if< std::is_base_of< ModelBaseT, ModelT >::value, void >::type
- template<class ReturnT , class ModelT , class ModelBaseT >
  using mappel::ReturnIfSubclassT = typename std::enable_if< std::is_base_of< ModelBaseT, ModelT >::value, ReturnT >::type
- template<class Model >
  using mappel::ImageCoordT = typename Model::ImageCoordT
- template<class Model >
  using mappel::ImagePixelT = typename Model::ImagePixelT
- template<class Model >
  using mappel::ParamT = typename Model::ParamT
- template<class Model >
  using mappel::ParamVecT = typename Model::ParamVecT
- template<class Model >
  using mappel::ImageT = typename Model::ImageT
- template<class Model >
  using mappel::ModelDataT = typename Model::ModelDataT
- template<class Model >
  using mappel::StencilT = typename Model::Stencil
- template<class Model >
  using mappel::ImageStackT = typename Model::ImageStackT
- template<class Model >
  using mappel::ModelDataStackT = typename Model::ModelDataStackT
- template<class Model >
  using mappel::StencilVecT = typename Model::StencilVecT
- using mappel::MappelError = backtrace_exception::BacktraceException

Functions

- void mappel::enable_all_cpus ()
- bool mappel::istarts_with (const char *s, const char *pattern)
- bool mappel::istarts_with (const std::string &str, const char *pattern)
- const char * mappel::icontains (const char *s, const char *pattern)
- int mappel::maxidx (const VecT &v)
- template<typename T >
  int mappel::sgn (T val)

  sign (signum) function: -1/0/1
- template<typename T >
  T mappel::square (T x)
- double mappel::restrict_value_range (double val, double minval, double maxval)
- template<typename T , typename... Args>
  std::unique_ptr< T > mappel::make_unique (Args &&...args)
- std::ostream & mappel::operator<< (std::ostream &out, const StatsT &stats)

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