Boxxer

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A tool for identifying individual Gaussian emitters for super-resolution microscopy toolchains.

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6 Namespace Documentation

6.1 boxxer Namespace Reference

Namespaces

- kernels

Classes

- class Boxxer2D
- class Boxxer3D
- class DoGFilter2D
- class DoGFilter3D
- class GaussFilter2D
- class GaussFilter3D
- class GaussFIRFilter
- class LoGFilter2D
- class LoGFilter3D
- struct LogicalError

  Internal logical error. Bad logic or broken promises.
- class Maxima2D
- class Maxima3D
- struct NumericalError

  Internal numerical error.
- struct ParameterShapeError

  Parameters are the incorrect shape, size or number of dimensions.
- struct ParameterValueError

  Parameter value is not valid.

Typedefs

- using BoxxerError = backtrace_exception::BacktraceException

6.1.1 Typedef Documentation

6.1.1.1 using boxxer::BoxxerError = typedef backtrace_exception::BacktraceException

Definition at line 14 of file BoxxerError.h.

6.2 boxxer::kernels Namespace Reference

Functions

1D Gauss FIR Filters

1D Gaussian finite-impulse response filters.

- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_1D (IntT size, const FloatT data[ ], FloatT fdata[ ], IntT hw, const FloatT kernel[ ])
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_1D (const arma::Col< FloatT > &data, arma::Col< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_1D_small (IntT size, const FloatT data[ ], FloatT fdata[ ], IntT hw, const FloatT kernel[ ])
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_1D_arma (const arma::Col< FloatT > &data, arma::Col< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_1D_inplace_arma (arma::Col< FloatT > &data, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_1D_inplace (IntT size, FloatT data[ ], IntT hw, const FloatT kernel[ ])

2D Gauss FIR Filters

2D Gaussian finite-impulse response filters.

- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_2Dx (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_2Dx_small (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::↩ Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_2Dx_arma (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::↩ Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_2Dy (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_2Dy_rowmajor (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma↩ ::Col< FloatT > &kernel)

- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_2Dy_colmajor (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_2Dy_small (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)

3D Gauss FIR Filters

3D Gaussian finite-impulse response filters.

- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_3Dx (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_3Dx_small (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_3Dy (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_3Dy_small (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_3Dz (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void gaussFIR_3Dz_small (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)

6.2.1 Detailed Description

Gaussian finite-impulse response kernels: 1D, 2D, and 3D

Template parameters for all namespace member functions. FloatT - float (default) or double. IntT - **signed** integer: int32_t (default) or int64_t.

All kernels are explicitly instantiated for:

- FloatT = float, IntT = int32_t
- FloatT = double, IntT = int32_t

There is no testing for integer overflow. Probably int32_t will be sensible for most applications.

6.2.2 Function Documentation

6.2.2.1 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_1D (IntT *size*, const FloatT *data[ ]*, FloatT *fdata[ ]*, IntT *hw*, const FloatT *kernel[ ]*)

This is details?

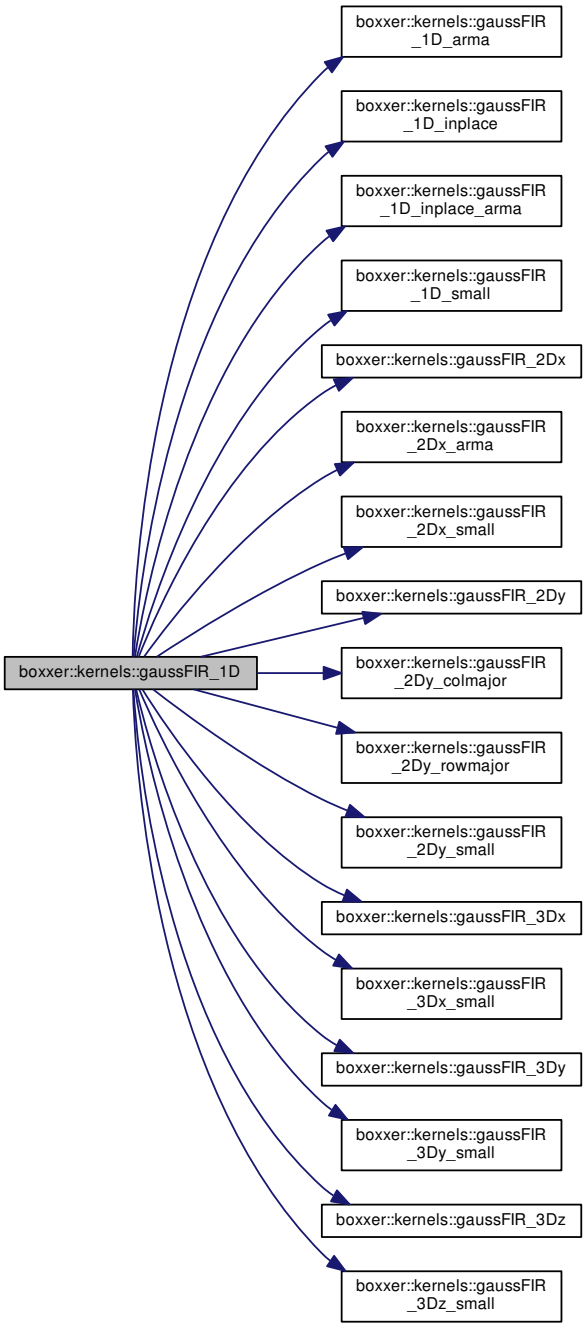
6.2.2.2 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_1D (const arma::Col< FloatT > & *data,* arma::Col< FloatT > & *fdata,* const arma::Col< FloatT > & *kernel*)

This is details?

Definition at line 39 of file FilterKernels.h.

References gaussFIR_1D_arma(), gaussFIR_1D_inplace(), gaussFIR_1D_inplace_arma(), gaussFIR_1D_small(), gaussFIR_2Dx(), gaussFIR_2Dx_arma(), gaussFIR_2Dx_small(), gaussFIR_2Dy(), gaussFIR_2Dy_colmajor(), gaussFIR_2Dy_rowmajor(), gaussFIR_2Dy_small(), gaussFIR_3Dx(), gaussFIR_3Dx_small(), gaussFIR_3Dy(), gaussFIR_3Dy_small(), gaussFIR_3Dz(), and gaussFIR_3Dz_small().

Here is the call graph for this function:

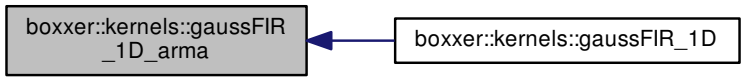


6.2.2.3 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_1D_arma (const arma::Col< FloatT > & *data,* arma::Col< FloatT > & *fdata,* const arma::Col< FloatT > & *kernel*)

This is details?

Referenced by gaussFIR_1D().

Here is the caller graph for this function:

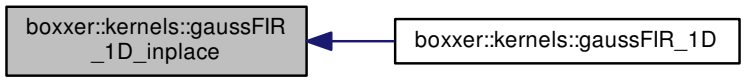


6.2.2.4 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_1D_inplace (IntT *size,* FloatT *data[ ],* IntT *hw,* const FloatT *kernel[ ]*)

This is details?

Referenced by gaussFIR_1D().

Here is the caller graph for this function:

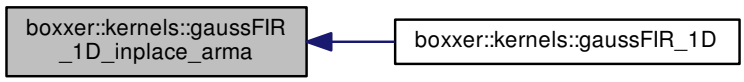


6.2.2.5 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_1D_inplace_arma (arma::Col< FloatT > & *data,* const arma::Col< FloatT > & *kernel*)

This is details?

Referenced by gaussFIR_1D().

Here is the caller graph for this function:

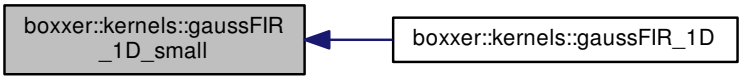


6.2.2.6 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_1D_small (IntT *size,* const FloatT *data[ ],* FloatT *fdata[ ],* IntT *hw,* const FloatT *kernel[ ]*)

This is details?

Referenced by gaussFIR_1D().

Here is the caller graph for this function:



6.2.2.7 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_2Dx (const arma::Mat< FloatT > & *data,* arma::Mat< FloatT > & *fdata,* const arma::Col< FloatT > & *kernel*)

2D Gauss FIR Filters

Referenced by gaussFIR_1D().

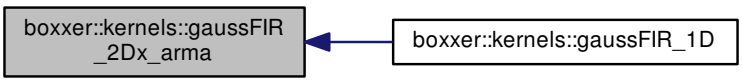
Here is the caller graph for this function:

6.2.2.8 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_2Dx_arma (const arma::Mat< FloatT > & *data,* arma::Mat< FloatT > & *fdata,* const arma::Col< FloatT > & *kernel*)

2D Gauss FIR Filters

Referenced by gaussFIR_1D().

Here is the caller graph for this function:

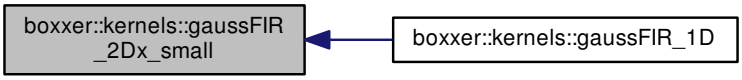


6.2.2.9 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_2Dx_small (const arma::Mat< FloatT > & *data,* arma::Mat< FloatT > & *fdata,* const arma::Col< FloatT > & *kernel*)

2D Gauss FIR Filters

Referenced by gaussFIR_1D().

Here is the caller graph for this function:



6.2.2.10 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_2Dy (const arma::Mat< FloatT > & *data,* arma::Mat< FloatT > & *fdata,* const arma::Col< FloatT > & *kernel*)

2D Gauss FIR Filters

Referenced by gaussFIR_1D().

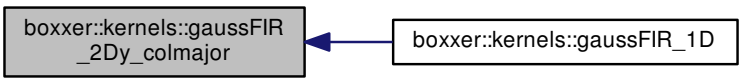
Here is the caller graph for this function:

6.2.2.11 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_2Dy_colmajor (const arma::Mat< FloatT > & *data,* arma::Mat< FloatT > & *fdata,* const arma::Col< FloatT > & *kernel*)

2D Gauss FIR Filters

Referenced by gaussFIR_1D().

Here is the caller graph for this function:

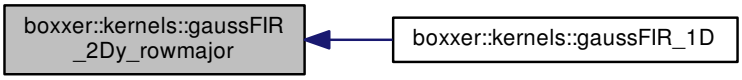


6.2.2.12 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_2Dy_rowmajor (const arma::Mat< FloatT > & *data*, arma::Mat< FloatT > & *fdata*, const arma::Col< FloatT > & *kernel*)

2D Gauss FIR Filters

Referenced by gaussFIR_1D().

Here is the caller graph for this function:

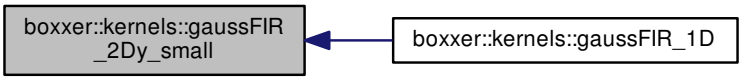


6.2.2.13 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_2Dy_small (const arma::Mat< FloatT > & *data*, arma::Mat< FloatT > & *fdata*, const arma::Col< FloatT > & *kernel*)

2D Gauss FIR Filters

Referenced by gaussFIR_1D().

Here is the caller graph for this function:



6.2.2.14 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_3Dx (const arma::Cube< FloatT > & *data*, arma::Cube< FloatT > & *fdata*, const arma::Col< FloatT > & *kernel*)

3D Gauss FIR Filters

Referenced by gaussFIR_1D().

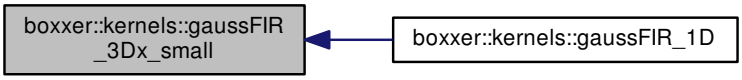
Here is the caller graph for this function:

6.2.2.15 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_3Dx_small (const arma::Cube< FloatT > & *data*, arma::Cube< FloatT > & *fdata*, const arma::Col< FloatT > & *kernel*)

3D Gauss FIR Filters

Referenced by gaussFIR_1D().

Here is the caller graph for this function:



6.2.2.16 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_3Dy (const arma::Cube< FloatT > & *data*, arma::Cube< FloatT > & *fdata*, const arma::Col< FloatT > & *kernel*)

3D Gauss FIR Filters

Referenced by gaussFIR_1D().

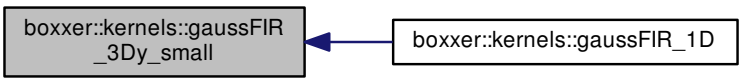
Here is the caller graph for this function:

6.2.2.17 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_3Dy_small (const arma::Cube< FloatT > & *data*, arma::Cube< FloatT > & *fdata*, const arma::Col< FloatT > & *kernel*)

3D Gauss FIR Filters

Referenced by gaussFIR_1D().

Here is the caller graph for this function:



6.2.2.18 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_3Dz (const arma::Cube< FloatT > & *data,* arma::Cube< FloatT > & *fdata,* const arma::Col< FloatT > & *kernel*)

3D Gauss FIR Filters

Referenced by gaussFIR_1D().

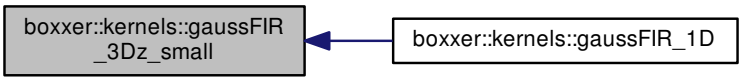
Here is the caller graph for this function:

6.2.2.19 template<class FloatT = float, class IntT = int32_t> void boxxer::kernels::gaussFIR_3Dz_small (const arma::Cube< FloatT > & *data,* arma::Cube< FloatT > & *fdata,* const arma::Col< FloatT > & *kernel*)

3D Gauss FIR Filters

Referenced by gaussFIR_1D().

Here is the caller graph for this function:



7 Class Documentation

7.1 boxxer::Boxxer2D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/Boxxer2D.h>`

Public Types

- using IVecT = arma::Col< IdxT >
- using IMatT = arma::Mat< IdxT >
- using VecT = arma::Col< FloatT >
- using MatT = arma::Mat< FloatT >
- using ImageT = arma::Mat< FloatT >
- using ImageStackT = arma::Cube< FloatT >
- using ScaledImageT = arma::Cube< FloatT >
- using ScaledImageStackT = hypercube::Hypercube< FloatT >

Public Member Functions

- Boxxer2D (const IVecT &imsize, const MatT &sigma)
- void setDoGSigmaRatio (FloatT sigma_ratio)
- void filterScaledLoG (const ImageStackT &im, ScaledImageStackT &fim) const
- void filterScaledDoG (const ImageStackT &im, ScaledImageStackT &fim) const
- IdxT scaleSpaceLoGMaxima (const ImageStackT &im, IMatT &maxima, VecT &max_vals, IdxT neighborhood↩ _size, IdxT scale_neighborhood_size) const
- IdxT scaleSpaceDoGMaxima (const ImageStackT &im, IMatT &maxima, VecT &max_vals, IdxT neighborhood↩ _size, IdxT scale_neighborhood_size) const
- ImageT make_image () const
- ImageStackT make_image_stack (IdxT nT) const
- ScaledImageT make_scaled_image () const
- ScaledImageStackT make_scaled_image_stack (IdxT nT) const

Static Public Member Functions

- static void filterLoG (const ImageStackT &im, ImageStackT &fim, const VecT &sigma)
- static void filterDoG (const ImageStackT &im, ImageStackT &fim, const VecT &sigma, FloatT sigma_ratio)
- static void filterGauss (const ImageStackT &im, ImageStackT &fim, const VecT &sigma)
- static void checkMaxima (const ImageStackT &im, IMatT &maxima, VecT &max_vals)
- static IdxT enumerateImageMaxima (const ImageStackT &im, IMatT &maxima, VecT &max_vals, IdxT neighborhood_size)

Public Attributes

- IdxT nScales
- IVecT imsize
- MatT sigma
- FloatT sigma_ratio

Static Public Attributes

- static const FloatT DefaultSigmaRatio
- static const IdxT dim

7.1.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::Boxxer2D< FloatT, IdxT >

In this class we make the assumption that images are stored in column-major format and that x=rows, y=cols, t=slices. This relationship is important in the choice of imsize and sigma parameters.

imsize = [nrows, ncols, nframes]; sigma = [sigma_rows (X scale=1), sigma_rows (X scale=2); sigma_cols(Y scale=1), sigma_cols (Y scale=2)]

This is contrary to normal image coordinates in matlab, but for this low level it is easier to think about x as the first index into an image and understand that the meaning for "X" and "Y" will be reversed from the matlab interpretation, but only internally within the Boxxer_IFace MexIFace class.

Definition at line 33 of file Boxxer2D.h.

7.1.2 Member Typedef Documentation

7.1.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer2D< FloatT, IdxT >::ImageStackT = arma::Cube<FloatT>

Definition at line 41 of file Boxxer2D.h.

7.1.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer2D< FloatT, IdxT >::ImageT = arma::Mat<FloatT>

Definition at line 40 of file Boxxer2D.h.

7.1.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer2D< FloatT, IdxT >::IMatT = arma::Mat<IdxT>

Definition at line 37 of file Boxxer2D.h.

7.1.2.4 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer2D< FloatT, IdxT >::IVecT = arma::Col<IdxT>

Definition at line 36 of file Boxxer2D.h.

7.1.2.5 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer2D< FloatT, IdxT >::MatT = arma::Mat<FloatT>

Definition at line 39 of file Boxxer2D.h.

7.1.2.6 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer2D< FloatT, IdxT >::ScaledImageStackT = hypercube::Hypercube<FloatT>

Definition at line 43 of file Boxxer2D.h.

7.1.2.7 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer2D< FloatT, IdxT >::ScaledImageT = arma::Cube<FloatT>

Definition at line 42 of file Boxxer2D.h.

7.1.2.8 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer2D< FloatT, IdxT >::VecT = arma::Col<FloatT>

Definition at line 38 of file Boxxer2D.h.

7.1.3 Constructor & Destructor Documentation

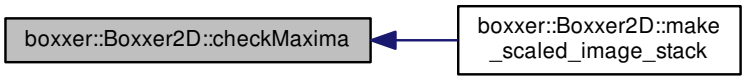
7.1.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::Boxxer2D< FloatT, IdxT >::Boxxer2D (const IVecT & *imsize,* const MatT & *sigma*)

7.1.4 Member Function Documentation

7.1.4.1 template<class FloatT = float, class IdxT = uint32_t> static void boxxer::Boxxer2D< FloatT, IdxT >::checkMaxima (const ImageStackT & *im,* IMatT & *maxima,* VecT & *max_vals*) [static]

Referenced by boxxer::Boxxer2D< FloatT, IdxT >::make_scaled_image_stack().

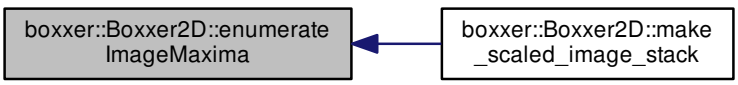
Here is the caller graph for this function:



7.1.4.2 template<class FloatT = float, class IdxT = uint32_t> static IdxT boxxer::Boxxer2D< FloatT, IdxT >::enumerateImageMaxima (const ImageStackT & *im,* IMatT & *maxima,* VecT & *max_vals,* IdxT *neighborhood_size*) [static]

Referenced by boxxer::Boxxer2D< FloatT, IdxT >::make_scaled_image_stack().

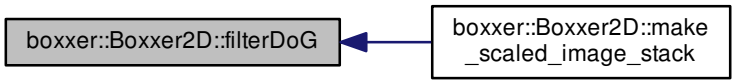
Here is the caller graph for this function:



7.1.4.3 template<class FloatT = float, class IdxT = uint32_t> static void boxxer::Boxxer2D< FloatT, IdxT >::filterDoG (const ImageStackT & *im,* ImageStackT & *fim,* const VecT & *sigma,* FloatT *sigma_ratio*) [static]

Referenced by boxxer::Boxxer2D< FloatT, IdxT >::make_scaled_image_stack().

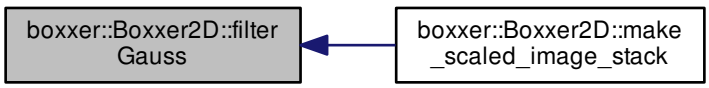
Here is the caller graph for this function:



7.1.4.4 template<class FloatT = float, class IdxT = uint32_t> static void boxxer::Boxxer2D< FloatT, IdxT >::filterGauss (const ImageStackT & *im,* ImageStackT & *fim,* const VecT & *sigma*) [static]

Referenced by boxxer::Boxxer2D< FloatT, IdxT >::make_scaled_image_stack().

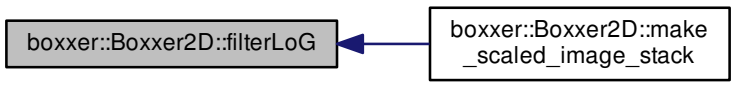
Here is the caller graph for this function:



7.1.4.5 template<class FloatT = float, class IdxT = uint32_t> static void boxxer::Boxxer2D< FloatT, IdxT >::filterLoG (const ImageStackT & *im,* ImageStackT & *fim,* const VecT & *sigma*) [static]

Referenced by boxxer::Boxxer2D< FloatT, IdxT >::make_scaled_image_stack().

Here is the caller graph for this function:



7.1.4.6 template<class FloatT = float, class IdxT = uint32_t> void boxxer::Boxxer2D< FloatT, IdxT >::filterScaledDoG (const ImageStackT & *im,* ScaledImageStackT & *fim*) const

7.1.4.7 template<class FloatT = float, class IdxT = uint32_t> void boxxer::Boxxer2D< FloatT, IdxT >::filterScaledLoG (const ImageStackT & *im,* ScaledImageStackT & *fim*) const

7.1.4.8 template<class FloatT = float, class IdxT = uint32_t> ImageT boxxer::Boxxer2D< FloatT, IdxT >::make_image ( ) const [inline]

Definition at line 61 of file Boxxer2D.h.

References boxxer::Boxxer2D< FloatT, IdxT >::imsize.

7.1.4.9 template<class FloatT = float, class IdxT = uint32_t> ImageStackT boxxer::Boxxer2D< FloatT, IdxT >::make_image_stack (IdxT *nT*) const [inline]

Definition at line 62 of file Boxxer2D.h.

References boxxer::Boxxer2D< FloatT, IdxT >::imsize.

7.1.4.10 template<class FloatT = float, class IdxT = uint32_t> ScaledImageT boxxer::Boxxer2D< FloatT, IdxT >::make_scaled_image ( ) const [inline]

Definition at line 63 of file Boxxer2D.h.

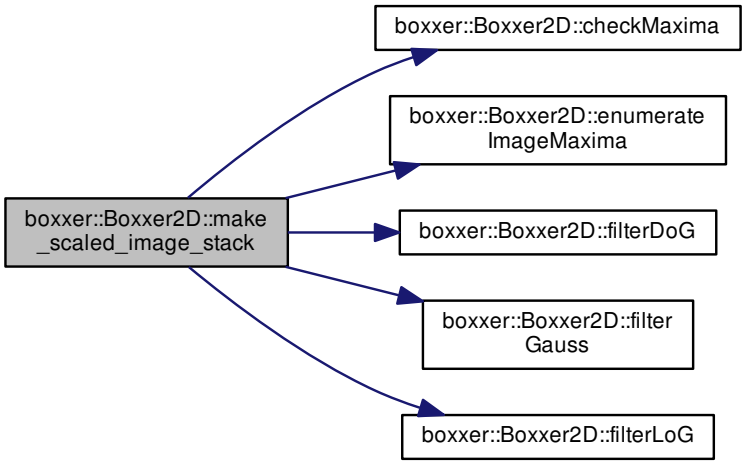
References boxxer::Boxxer2D< FloatT, IdxT >::imsize.

7.1.4.11 template<class FloatT = float, class IdxT = uint32_t> ScaledImageStackT boxxer::Boxxer2D< FloatT, IdxT >::make_scaled_image_stack (IdxT *nT*) const [inline]

Definition at line 64 of file Boxxer2D.h.

References boxxer::Boxxer2D< FloatT, IdxT >::checkMaxima(), boxxer::Boxxer2D< FloatT, IdxT >::enumerate↩ ImageMaxima(), boxxer::Boxxer2D< FloatT, IdxT >::filterDoG(), boxxer::Boxxer2D< FloatT, IdxT >::filterGauss(), boxxer::Boxxer2D< FloatT, IdxT >::filterLoG(), and boxxer::Boxxer2D< FloatT, IdxT >::imsize.

Here is the call graph for this function:



7.1.4.12 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::Boxxer2D< FloatT, IdxT >::scaleSpaceDoGMaxima (const ImageStackT & *im,* IMatT & *maxima,* VecT & *max_vals,* IdxT *neighborhood_size,* IdxT *scale_neighborhood_size*) const

7.1.4.13 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::Boxxer2D< FloatT, IdxT >::scaleSpaceLoGMaxima (const ImageStackT & *im,* IMatT & *maxima,* VecT & *max_vals,* IdxT *neighborhood_size,* IdxT *scale_neighborhood_size*) const

7.1.4.14 template<class FloatT = float, class IdxT = uint32_t> void boxxer::Boxxer2D< FloatT, IdxT >::setDoGSigmaRatio (FloatT *sigma_ratio*)

7.1.5 Member Data Documentation

7.1.5.1 template<class FloatT = float, class IdxT = uint32_t> const FloatT boxxer::Boxxer2D< FloatT, IdxT >::DefaultSigmaRatio [static]

Definition at line 45 of file Boxxer2D.h.

7.1.5.2 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::Boxxer2D< FloatT, IdxT >::dim [static]

Definition at line 46 of file Boxxer2D.h.

7.1.5.3 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::Boxxer2D< FloatT, IdxT >::imsize

Definition at line 49 of file Boxxer2D.h.

Referenced by boxxer::Boxxer2D< FloatT, IdxT >::make_image(), boxxer::Boxxer2D< FloatT, IdxT >::make_image_stack(), boxxer::Boxxer2D< FloatT, IdxT >::make_scaled_image(), and boxxer::Boxxer2D< FloatT, IdxT >::make_scaled_image_stack().

7.1.5.4 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::Boxxer2D< FloatT, IdxT >::nScales

Definition at line 48 of file Boxxer2D.h.

7.1.5.5 template<class FloatT = float, class IdxT = uint32_t> MatT boxxer::Boxxer2D< FloatT, IdxT >::sigma

Definition at line 50 of file Boxxer2D.h.

7.1.5.6 template<class FloatT = float, class IdxT = uint32_t> FloatT boxxer::Boxxer2D< FloatT, IdxT >::sigma_ratio

Definition at line 51 of file Boxxer2D.h.

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

- Boxxer2D.h

7.2 boxxer::Boxxer3D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/Boxxer3D.h>`

Public Types

- using IVecT = arma::Col< IdxT >
- using IMatT = arma::Mat< IdxT >
- using VecT = arma::Col< FloatT >
- using MatT = arma::Mat< FloatT >
- using ImageT = arma::Cube< FloatT >
- using ImageStackT = hypercube::Hypercube< FloatT >
- using ScaledImageT = hypercube::Hypercube< FloatT >

Public Member Functions

- Boxxer3D (const IVecT &size, const MatT &sigma)
- void setDoGSigmaRatio (FloatT sigma_ratio)
- void filterScaledLoG (const ImageT &im, ScaledImageT &fim)
- void filterScaledDoG (const ImageT &im, ScaledImageT &fim)
- IdxT scaleSpaceLoGMaxima (const ImageStackT &im, IMatT &maxima, VecT &max_vals, IdxT neighborhood↩ _size, IdxT scale_neighborhood_size)
- IdxT scaleSpaceDoGMaxima (const ImageStackT &im, IMatT &maxima, VecT &max_vals, IdxT neighborhood↩ _size, IdxT scale_neighborhood_size)
- ImageT make_image () const
- ImageStackT make_image_stack (IdxT nT) const
- ScaledImageT make_scaled_image () const

Static Public Member Functions

- static void filterLoG (const ImageStackT &im, ImageStackT &fim, const VecT &sigma)
- static void filterDoG (const ImageStackT &im, ImageStackT &fim, const VecT &sigma, FloatT sigma_ratio)
- static void filterGauss (const ImageStackT &im, ImageStackT &fim, const VecT &sigma)
- static void checkMaxima (const ImageStackT &im, IMatT &maxima, VecT &max_vals)
- static IdxT enumerateImageMaxima (const ImageStackT &im, IMatT &maxima, VecT &max_vals, IdxT neighborhood_size)

Public Attributes

- IdxT nScales
- IVecT imsize
- MatT sigma
- FloatT sigma_ratio

Static Public Attributes

- static const FloatT DefaultSigmaRatio
- static const IdxT dim

7.2.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::Boxxer3D< FloatT, IdxT >

A box finding algorithm for 3D hyper-spectral microscopy data.

Estimates the center coordinates of Gaussian blobs with anisotropic sigmas.

All image data manipulated is stored as column-major FloatT arrays with dimension ordering [L Y X T].

The Boxxer3D class makes uses of lower level class which are agnostic about the data source being hyperspectral, they don't care what the coordinate dimensions represent scientifically, but this class is associated with the Matlab Boxxer3D class and so maintains the knowledge that the actual coordinates are [L Y X T].

Definition at line 27 of file Boxxer3D.h.

7.2.2 Member Typedef Documentation

7.2.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer3D< FloatT, IdxT >::ImageStackT = hypercube::Hypercube<FloatT>

Definition at line 35 of file Boxxer3D.h.

7.2.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer3D< FloatT, IdxT >::ImageT = arma::Cube<FloatT>

Definition at line 34 of file Boxxer3D.h.

7.2.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer3D< FloatT, IdxT >::IMatT = arma::Mat<IdxT>

Definition at line 31 of file Boxxer3D.h.

7.2.2.4 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer3D< FloatT, IdxT >::IVecT = arma::Col<IdxT>

Definition at line 30 of file Boxxer3D.h.

7.2.2.5 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer3D< FloatT, IdxT >::MatT = arma::Mat<FloatT>

Definition at line 33 of file Boxxer3D.h.

7.2.2.6 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer3D< FloatT, IdxT >::ScaledImageT = hypercube::Hypercube<FloatT>

Definition at line 36 of file Boxxer3D.h.

7.2.2.7 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Boxxer3D< FloatT, IdxT >::VecT = arma::Col<FloatT>

Definition at line 32 of file Boxxer3D.h.

7.2.3 Constructor & Destructor Documentation

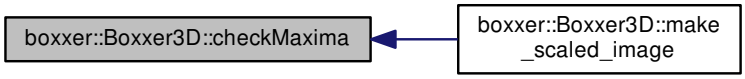
7.2.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::Boxxer3D< FloatT, IdxT >::Boxxer3D (const IVecT & *size,* const MatT & *sigma*)

7.2.4 Member Function Documentation

7.2.4.1 template<class FloatT = float, class IdxT = uint32_t> static void boxxer::Boxxer3D< FloatT, IdxT >::checkMaxima (const ImageStackT & *im,* IMatT & *maxima,* VecT & *max_vals*) [static]

Referenced by boxxer::Boxxer3D< FloatT, IdxT >::make_scaled_image().

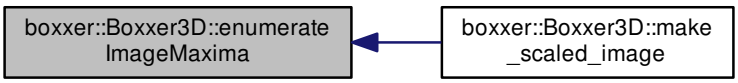
Here is the caller graph for this function:



7.2.4.2 template<class FloatT = float, class IdxT = uint32_t> static IdxT boxxer::Boxxer3D< FloatT, IdxT >::enumerateImageMaxima (const ImageStackT & *im,* IMatT & *maxima,* VecT & *max_vals,* IdxT *neighborhood_size*) [static]

Referenced by boxxer::Boxxer3D< FloatT, IdxT >::make_scaled_image().

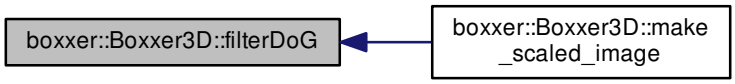
Here is the caller graph for this function:



7.2.4.3 template<class FloatT = float, class IdxT = uint32_t> static void boxxer::Boxxer3D< FloatT, IdxT >::filterDoG (const ImageStackT & *im,* ImageStackT & *fim,* const VecT & *sigma,* FloatT *sigma_ratio*) [static]

Referenced by boxxer::Boxxer3D< FloatT, IdxT >::make_scaled_image().

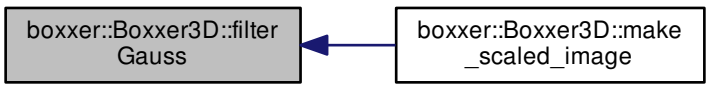
Here is the caller graph for this function:



7.2.4.4 template<class FloatT = float, class IdxT = uint32_t> static void boxxer::Boxxer3D< FloatT, IdxT >::filterGauss (const ImageStackT & *im,* ImageStackT & *fim,* const VecT & *sigma*) [static]

Referenced by boxxer::Boxxer3D< FloatT, IdxT >::make_scaled_image().

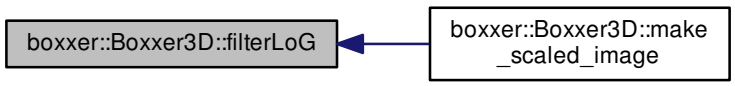
Here is the caller graph for this function:



7.2.4.5 template<class FloatT = float, class IdxT = uint32_t> static void boxxer::Boxxer3D< FloatT, IdxT >::filterLoG (const ImageStackT & *im,* ImageStackT & *fim,* const VecT & *sigma*) [static]

Referenced by boxxer::Boxxer3D< FloatT, IdxT >::make_scaled_image().

Here is the caller graph for this function:



7.2.4.6 template<class FloatT = float, class IdxT = uint32_t> void boxxer::Boxxer3D< FloatT, IdxT >::filterScaledDoG (const ImageT & *im,* ScaledImageT & *fim*)

7.2.4.7 template<class FloatT = float, class IdxT = uint32_t> void boxxer::Boxxer3D< FloatT, IdxT >::filterScaledLoG (const ImageT & *im,* ScaledImageT & *fim*)

7.2.4.8 template<class FloatT = float, class IdxT = uint32_t> ImageT boxxer::Boxxer3D< FloatT, IdxT >::make_image ( ) const [inline]

Definition at line 55 of file Boxxer3D.h.

References boxxer::Boxxer3D< FloatT, IdxT >::imsize.

7.2.4.9 template<class FloatT = float, class IdxT = uint32_t> ImageStackT boxxer::Boxxer3D< FloatT, IdxT >::make_image_stack (IdxT *nT*) const [inline]

Definition at line 56 of file Boxxer3D.h.

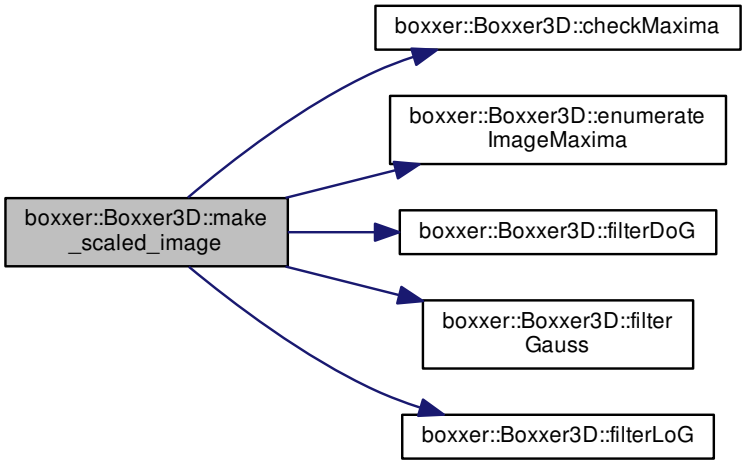
References boxxer::Boxxer3D< FloatT, IdxT >::imsize.

7.2.4.10 template<class FloatT = float, class IdxT = uint32_t> ScaledImageT boxxer::Boxxer3D< FloatT, IdxT >::make_scaled_image ( ) const [inline]

Definition at line 57 of file Boxxer3D.h.

References boxxer::Boxxer3D< FloatT, IdxT >::checkMaxima(), boxxer::Boxxer3D< FloatT, IdxT >::enumerate↩ ImageMaxima(), boxxer::Boxxer3D< FloatT, IdxT >::filterDoG(), boxxer::Boxxer3D< FloatT, IdxT >::filterGauss(), boxxer::Boxxer3D< FloatT, IdxT >::filterLoG(), and boxxer::Boxxer3D< FloatT, IdxT >::imsize.

Here is the call graph for this function:



7.2.4.11 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::Boxxer3D< FloatT, IdxT >::scaleSpaceDoGMaxima (const ImageStackT & *im,* IMatT & *maxima,* VecT & *max_vals,* IdxT *neighborhood_size,* IdxT *scale_neighborhood_size*)

7.2.4.12 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::Boxxer3D< FloatT, IdxT >::scaleSpaceLoGMaxima (const ImageStackT & *im,* IMatT & *maxima,* VecT & *max_vals,* IdxT *neighborhood_size,* IdxT *scale_neighborhood_size*)

7.2.4.13 template<class FloatT = float, class IdxT = uint32_t> void boxxer::Boxxer3D< FloatT, IdxT >::setDoGSigmaRatio (FloatT *sigma_ratio*)

7.2.5 Member Data Documentation

7.2.5.1 template<class FloatT = float, class IdxT = uint32_t> const FloatT boxxer::Boxxer3D< FloatT, IdxT >::DefaultSigmaRatio [static]

Definition at line 38 of file Boxxer3D.h.

7.2.5.2 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::Boxxer3D< FloatT, IdxT >::dim [static]

Definition at line 39 of file Boxxer3D.h.

7.2.5.3 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::Boxxer3D< FloatT, IdxT >::imsize

Definition at line 42 of file Boxxer3D.h.

Referenced by boxxer::Boxxer3D< FloatT, IdxT >::make_image(), boxxer::Boxxer3D< FloatT, IdxT >::make_image_stack(), and boxxer::Boxxer3D< FloatT, IdxT >::make_scaled_image().

7.2.5.4 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::Boxxer3D< FloatT, IdxT >::nScales

Definition at line 41 of file Boxxer3D.h.

7.2.5.5 template<class FloatT = float, class IdxT = uint32_t> MatT boxxer::Boxxer3D< FloatT, IdxT >::sigma

Definition at line 43 of file Boxxer3D.h.

7.2.5.6 template<class FloatT = float, class IdxT = uint32_t> FloatT boxxer::Boxxer3D< FloatT, IdxT >::sigma_ratio

Definition at line 45 of file Boxxer3D.h.

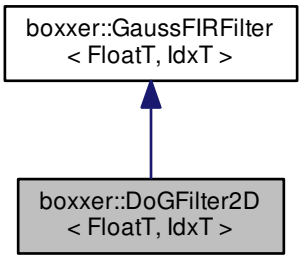
The documentation for this class was generated from the following file:

- Boxxer3D.h

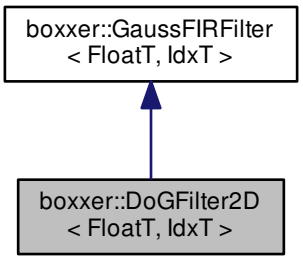
7.3 boxxer::DoGFilter2D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/GaussFilter.h>`

Inheritance diagram for boxxer::DoGFilter2D< FloatT, IdxT >:



Collaboration diagram for boxxer::DoGFilter2D< FloatT, IdxT >:



Public Types

- using IVecT = typename GaussFIRFilter< FloatT, IdxT >::IVecT
- using VecT = typename GaussFIRFilter< FloatT, IdxT >::VecT
- using ImageT = arma::Mat< FloatT >
- using MatT = arma::Mat< FloatT >

Public Member Functions

- DoGFilter2D (const IVecT &size, const VecT &sigma, FloatT sigma_ratio)
- DoGFilter2D (const IVecT &size, const VecT &sigma, FloatT sigma_ratio, const IVecT &kernel_hw)
- void set_kernel_hw (const IVecT &kernel_half_width)
- void set_sigma_ratio (FloatT sigma_ratio)
- ImageT make_image () const
- void filter (const ImageT &im, ImageT &out)
- void test_filter (const ImageT &im)

Static Public Member Functions

- static VecT compute_Gauss_FIR_kernel (FloatT sigma, IdxT hw)
- static VecT compute_LoG_FIR_kernel (FloatT sigma, IdxT hw)

Public Attributes

- FloatT sigma_ratio
- IdxT dim
- IVecT size
- VecT sigma
- IVecT hw

Static Protected Attributes

- static const IdxT max_kernel_hw
- static const FloatT default_sigma_hw_ratio

Friends

- template<class FloatT_ , class IdxT_ >
  std::ostream & operator<< (std::ostream &out, const DoGFilter2D< FloatT_, IdxT_ > &filt)

7.3.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::DoGFilter2D< FloatT, IdxT >

Definition at line 70 of file GaussFilter.h.

7.3.2 Member Typedef Documentation

7.3.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::DoGFilter2D< FloatT, IdxT >::ImageT = arma::Mat<FloatT>

Definition at line 75 of file GaussFilter.h.

7.3.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::DoGFilter2D< FloatT, IdxT >::IVecT = typename GaussFIRFilter<FloatT,IdxT>::IVecT

Definition at line 73 of file GaussFilter.h.

7.3.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFIRFilter< FloatT, IdxT >::MatT = arma::Mat<FloatT> [inherited]

Definition at line 26 of file GaussFilter.h.

7.3.2.4 template<class FloatT = float, class IdxT = uint32_t> using boxxer::DoGFilter2D< FloatT, IdxT >::VecT = typename GaussFIRFilter<FloatT,IdxT>::VecT

Definition at line 74 of file GaussFilter.h.

7.3.3 Constructor & Destructor Documentation

7.3.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::DoGFilter2D< FloatT, IdxT >::DoGFilter2D (const IVecT & *size,* const VecT & *sigma,* FloatT *sigma_ratio*)

7.3.3.2 template<class FloatT = float, class IdxT = uint32_t> boxxer::DoGFilter2D< FloatT, IdxT >::DoGFilter2D (const IVecT & *size,* const VecT & *sigma,* FloatT *sigma_ratio,* const IVecT & *kernel_hw*)

7.3.4 Member Function Documentation

7.3.4.1 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_Gauss_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.3.4.2 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_LoG_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.3.4.3 template<class FloatT = float, class IdxT = uint32_t> void boxxer::DoGFilter2D< FloatT, IdxT >::filter (const ImageT & *im,* ImageT & *out*)

7.3.4.4 template<class FloatT = float, class IdxT = uint32_t> ImageT boxxer::DoGFilter2D< FloatT, IdxT >::make_image ( ) const [inline]

Definition at line 83 of file GaussFilter.h.

References boxxer::GaussFIRFilter< FloatT, IdxT >::size.

7.3.4.5 template<class FloatT = float, class IdxT = uint32_t> void boxxer::DoGFilter2D< FloatT, IdxT >::set_kernel_hw (const IVecT & *kernel_half_width*) [virtual]

Implements boxxer::GaussFIRFilter< FloatT, IdxT >.

7.3.4.6 template<class FloatT = float, class IdxT = uint32_t> void boxxer::DoGFilter2D< FloatT, IdxT >::set_sigma_ratio (FloatT *sigma_ratio*)

7.3.4.7 template<class FloatT = float, class IdxT = uint32_t> void boxxer::DoGFilter2D< FloatT, IdxT >::test_filter (const ImageT & *im*)

7.3.5 Friends And Related Function Documentation

7.3.5.1 template<class FloatT = float, class IdxT = uint32_t> template<class FloatT_ , class IdxT_ > std::ostream& operator<< (std::ostream & *out,* const DoGFilter2D< FloatT_, IdxT_ > & *filt*) [friend]

7.3.6 Member Data Documentation

7.3.6.1 template<class FloatT = float, class IdxT = uint32_t> const FloatT boxxer::GaussFIRFilter< FloatT, IdxT >::default_sigma_hw_ratio [static], [protected], [inherited]

Definition at line 41 of file GaussFilter.h.

7.3.6.2 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::dim [inherited]

Definition at line 28 of file GaussFilter.h.

7.3.6.3 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::hw [inherited]

Definition at line 31 of file GaussFilter.h.

7.3.6.4 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::max_kernel_hw [static], [protected], [inherited]

Definition at line 40 of file GaussFilter.h.

7.3.6.5 template<class FloatT = float, class IdxT = uint32_t> VecT boxxer::GaussFIRFilter< FloatT, IdxT >::sigma [inherited]

Definition at line 30 of file GaussFilter.h.

7.3.6.6 template<class FloatT = float, class IdxT = uint32_t> FloatT boxxer::DoGFilter2D< FloatT, IdxT >::sigma_ratio

Definition at line 77 of file GaussFilter.h.

7.3.6.7 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::size [inherited]

Definition at line 29 of file GaussFilter.h.

Referenced by boxxer::GaussFilter2D< FloatT, IdxT >::make_image(), boxxer::DoGFilter2D< FloatT, IdxT >::make_image(), boxxer::LoGFilter2D< FloatT, IdxT >::make_image(), boxxer::GaussFilter3D< FloatT, IdxT >::make_image(), boxxer::DoGFilter3D< FloatT, IdxT >::make_image(), and boxxer::LoGFilter3D< FloatT, IdxT >::make_image().

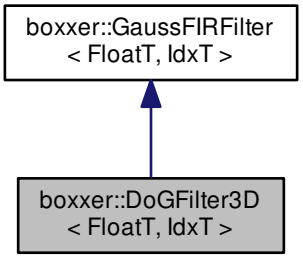
The documentation for this class was generated from the following file:

- GaussFilter.h

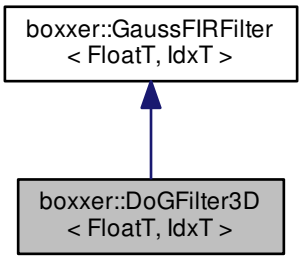
7.4 boxxer::DoGFilter3D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/GaussFilter.h>`

Inheritance diagram for boxxer::DoGFilter3D< FloatT, IdxT >:



Collaboration diagram for boxxer::DoGFilter3D< FloatT, IdxT >:



Public Types

- using IVecT = typename GaussFIRFilter< FloatT, IdxT >::IVecT
- using VecT = typename GaussFIRFilter< FloatT, IdxT >::VecT
- using ImageT = arma::Cube< FloatT >
- using MatT = arma::Mat< FloatT >

Public Member Functions

- DoGFilter3D (const IVecT &size, const VecT &sigma, FloatT sigma_ratio)
- DoGFilter3D (const IVecT &size, const VecT &sigma, FloatT sigma_ratio, const IVecT &kernel_hw)
- void set_kernel_hw (const IVecT &kernel_half_width)
- void set_sigma_ratio (FloatT sigma_ratio)
- ImageT make_image () const
- void filter (const ImageT &im, ImageT &out)
- void test_filter (const ImageT &im)

Static Public Member Functions

- static VecT compute_Gauss_FIR_kernel (FloatT sigma, IdxT hw)
- static VecT compute_LoG_FIR_kernel (FloatT sigma, IdxT hw)

Public Attributes

- FloatT sigma_ratio
- IdxT dim
- IVecT size
- VecT sigma
- IVecT hw

Static Protected Attributes

- static const IdxT max_kernel_hw
- static const FloatT default_sigma_hw_ratio

Friends

- template<class FloatT_ , class IdxT_ >
  std::ostream & operator<< (std::ostream &out, const GaussFilter3D< FloatT_, IdxT_ > &filt)

7.4.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::DoGFilter3D< FloatT, IdxT >

Definition at line 150 of file GaussFilter.h.

7.4.2 Member Typedef Documentation

7.4.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::DoGFilter3D< FloatT, IdxT >::ImageT = arma::Cube<FloatT>

Definition at line 155 of file GaussFilter.h.

7.4.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::DoGFilter3D< FloatT, IdxT >::IVecT = typename GaussFIRFilter<FloatT,IdxT>::IVecT

Definition at line 153 of file GaussFilter.h.

7.4.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFIRFilter< FloatT, IdxT >::MatT = arma::Mat<FloatT> [inherited]

Definition at line 26 of file GaussFilter.h.

7.4.2.4 template<class FloatT = float, class IdxT = uint32_t> using boxxer::DoGFilter3D< FloatT, IdxT >::VecT = typename GaussFIRFilter<FloatT,IdxT>::VecT

Definition at line 154 of file GaussFilter.h.

7.4.3 Constructor & Destructor Documentation

7.4.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::DoGFilter3D< FloatT, IdxT >::DoGFilter3D (const IVecT & *size,* const VecT & *sigma,* FloatT *sigma_ratio*)

7.4.3.2 template<class FloatT = float, class IdxT = uint32_t> boxxer::DoGFilter3D< FloatT, IdxT >::DoGFilter3D (const IVecT & *size,* const VecT & *sigma,* FloatT *sigma_ratio,* const IVecT & *kernel_hw*)

7.4.4 Member Function Documentation

7.4.4.1 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_Gauss_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.4.4.2 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_LoG_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.4.4.3 template<class FloatT = float, class IdxT = uint32_t> void boxxer::DoGFilter3D< FloatT, IdxT >::filter (const ImageT & *im,* ImageT & *out*)

7.4.4.4 template<class FloatT = float, class IdxT = uint32_t> ImageT boxxer::DoGFilter3D< FloatT, IdxT >::make_image ( ) const [inline]

Definition at line 163 of file GaussFilter.h.

References boxxer::GaussFIRFilter< FloatT, IdxT >::size.

7.4.4.5 template<class FloatT = float, class IdxT = uint32_t> void boxxer::DoGFilter3D< FloatT, IdxT >::set_kernel_hw (const IVecT & *kernel_half_width*) [virtual]

Implements boxxer::GaussFIRFilter< FloatT, IdxT >.

7.4.4.6 template<class FloatT = float, class IdxT = uint32_t> void boxxer::DoGFilter3D< FloatT, IdxT >::set_sigma_ratio (FloatT *sigma_ratio*)

7.4.4.7 template<class FloatT = float, class IdxT = uint32_t> void boxxer::DoGFilter3D< FloatT, IdxT >::test_filter (const ImageT & *im*)

7.4.5 Friends And Related Function Documentation

7.4.5.1 template<class FloatT = float, class IdxT = uint32_t> template<class FloatT_ , class IdxT_ > std::ostream& operator<< (std::ostream & *out,* const GaussFilter3D< FloatT_, IdxT_ > & *filt*) [friend]

7.4.6 Member Data Documentation

7.4.6.1 template<class FloatT = float, class IdxT = uint32_t> const FloatT boxxer::GaussFIRFilter< FloatT, IdxT >::default_sigma_hw_ratio [static], [protected], [inherited]

Definition at line 41 of file GaussFilter.h.

7.4.6.2 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::dim [inherited]

Definition at line 28 of file GaussFilter.h.

7.4.6.3 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::hw [inherited]

Definition at line 31 of file GaussFilter.h.

7.4.6.4 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::max_kernel_hw [static], [protected], [inherited]

Definition at line 40 of file GaussFilter.h.

7.4.6.5 template<class FloatT = float, class IdxT = uint32_t> VecT boxxer::GaussFIRFilter< FloatT, IdxT >::sigma [inherited]

Definition at line 30 of file GaussFilter.h.

7.4.6.6 template<class FloatT = float, class IdxT = uint32_t> FloatT boxxer::DoGFilter3D< FloatT, IdxT >::sigma_ratio

Definition at line 157 of file GaussFilter.h.

7.4.6.7 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::size [inherited]

Definition at line 29 of file GaussFilter.h.

Referenced by boxxer::GaussFilter2D< FloatT, IdxT >::make_image(), boxxer::DoGFilter2D< FloatT, IdxT >::make_image(), boxxer::LoGFilter2D< FloatT, IdxT >::make_image(), boxxer::GaussFilter3D< FloatT, IdxT >::make_image(), boxxer::DoGFilter3D< FloatT, IdxT >::make_image(), and boxxer::LoGFilter3D< FloatT, IdxT >::make_image().

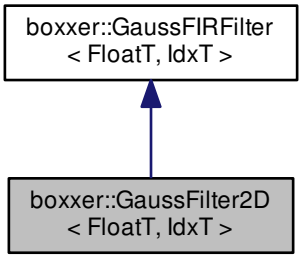
The documentation for this class was generated from the following file:

- GaussFilter.h

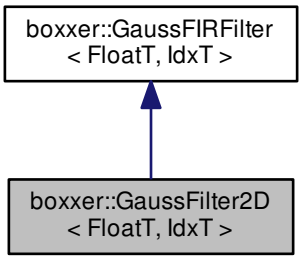
7.5 boxxer::GaussFilter2D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/GaussFilter.h>`

Inheritance diagram for boxxer::GaussFilter2D< FloatT, IdxT >:



Collaboration diagram for boxxer::GaussFilter2D< FloatT, IdxT >:



Public Types

- using IVecT = typename GaussFIRFilter< FloatT, IdxT >::IVecT
- using VecT = typename GaussFIRFilter< FloatT, IdxT >::VecT
- using ImageT = arma::Mat< FloatT >
- using MatT = arma::Mat< FloatT >

Public Member Functions

- GaussFilter2D (const IVecT &size, const VecT &sigma)
- GaussFilter2D (const IVecT &size, const VecT &sigma, const IVecT &kernel_hw)
- void set_kernel_hw (const IVecT &kernel_half_width)
- ImageT make_image () const
- void filter (const ImageT &im, ImageT &out)
- void test_filter (const ImageT &im)

Static Public Member Functions

- static VecT compute_Gauss_FIR_kernel (FloatT sigma, IdxT hw)
- static VecT compute_LoG_FIR_kernel (FloatT sigma, IdxT hw)

Public Attributes

- IdxT dim
- IVecT size
- VecT sigma
- IVecT hw

Static Protected Attributes

- static const IdxT max_kernel_hw
- static const FloatT default_sigma_hw_ratio

Friends

- template<class FloatT_ , class IdxT_ >
  std::ostream & operator<< (std::ostream &out, const GaussFilter2D< FloatT_, IdxT_ > &filt)

7.5.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::GaussFilter2D< FloatT, IdxT >

2D Filters

Definition at line 47 of file GaussFilter.h.

7.5.2 Member Typedef Documentation

7.5.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFilter2D< FloatT, IdxT >::ImageT = arma::Mat<FloatT>

Definition at line 52 of file GaussFilter.h.

7.5.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFilter2D< FloatT, IdxT >::IVecT = typename GaussFIRFilter<FloatT,IdxT>::IVecT

Definition at line 50 of file GaussFilter.h.

7.5.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFIRFilter< FloatT, IdxT >::MatT = arma::Mat<FloatT> [inherited]

Definition at line 26 of file GaussFilter.h.

7.5.2.4 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFilter2D< FloatT, IdxT >::VecT = typename GaussFIRFilter<FloatT,IdxT>::VecT

Definition at line 51 of file GaussFilter.h.

7.5.3 Constructor & Destructor Documentation

7.5.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::GaussFilter2D< FloatT, IdxT >::GaussFilter2D (const IVecT & *size,* const VecT & *sigma*)

7.5.3.2 template<class FloatT = float, class IdxT = uint32_t> boxxer::GaussFilter2D< FloatT, IdxT >::GaussFilter2D (const IVecT & *size,* const VecT & *sigma,* const IVecT & *kernel_hw*)

7.5.4 Member Function Documentation

7.5.4.1 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_Gauss_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.5.4.2 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_LoG_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.5.4.3 template<class FloatT = float, class IdxT = uint32_t> void boxxer::GaussFilter2D< FloatT, IdxT >::filter (const ImageT & *im,* ImageT & *out*)

7.5.4.4 template<class FloatT = float, class IdxT = uint32_t> ImageT boxxer::GaussFilter2D< FloatT, IdxT >::make_image ( ) const [inline]

Definition at line 57 of file GaussFilter.h.

References boxxer::GaussFIRFilter< FloatT, IdxT >::size.

7.5.4.5 template<class FloatT = float, class IdxT = uint32_t> void boxxer::GaussFilter2D< FloatT, IdxT >::set_kernel_hw (const IVecT & *kernel_half_width*) [virtual]

Implements boxxer::GaussFIRFilter< FloatT, IdxT >.

7.5.4.6 template<class FloatT = float, class IdxT = uint32_t> void boxxer::GaussFilter2D< FloatT, IdxT >::test_filter (const ImageT & *im*)

7.5.5 Friends And Related Function Documentation

7.5.5.1 template<class FloatT = float, class IdxT = uint32_t> template<class FloatT_ , class IdxT_ > std::ostream& operator<< (std::ostream & *out,* const GaussFilter2D< FloatT_, IdxT_ > & *filt*) [friend]

7.5.6 Member Data Documentation

7.5.6.1 template<class FloatT = float, class IdxT = uint32_t> const FloatT boxxer::GaussFIRFilter< FloatT, IdxT >::default_sigma_hw_ratio [static], [protected], [inherited]

Definition at line 41 of file GaussFilter.h.

7.5.6.2 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::dim [inherited]

Definition at line 28 of file GaussFilter.h.

7.5.6.3 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::hw [inherited]

Definition at line 31 of file GaussFilter.h.

7.5.6.4 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::max_kernel_hw [static], [protected], [inherited]

Definition at line 40 of file GaussFilter.h.

7.5.6.5 template<class FloatT = float, class IdxT = uint32_t> VecT boxxer::GaussFIRFilter< FloatT, IdxT >::sigma [inherited]

Definition at line 30 of file GaussFilter.h.

7.5.6.6 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::size [inherited]

Definition at line 29 of file GaussFilter.h.

Referenced by boxxer::GaussFilter2D< FloatT, IdxT >::make_image(), boxxer::DoGFilter2D< FloatT, IdxT >::make_↩ image(), boxxer::LoGFilter2D< FloatT, IdxT >::make_image(), boxxer::GaussFilter3D< FloatT, IdxT >::make_image(), boxxer::DoGFilter3D< FloatT, IdxT >::make_image(), and boxxer::LoGFilter3D< FloatT, IdxT >::make_image().

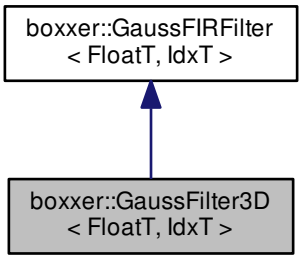
The documentation for this class was generated from the following file:

- GaussFilter.h

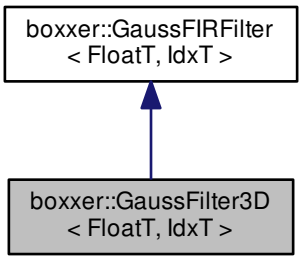
7.6 boxxer::GaussFilter3D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/GaussFilter.h>`

Inheritance diagram for boxxer::GaussFilter3D< FloatT, IdxT >:



Collaboration diagram for boxxer::GaussFilter3D< FloatT, IdxT >:



Public Types

- using IVecT = typename GaussFIRFilter< FloatT, IdxT >::IVecT
- using VecT = typename GaussFIRFilter< FloatT, IdxT >::VecT
- using ImageT = arma::Cube< FloatT >
- using MatT = arma::Mat< FloatT >

Public Member Functions

- GaussFilter3D (const IVecT &size, const VecT &sigma)
- GaussFilter3D (const IVecT &size, const VecT &sigma, const IVecT &kernel_hw)
- void set_kernel_hw (const IVecT &kernel_half_width)
- ImageT make_image () const
- void filter (const ImageT &im, ImageT &out)
- void test_filter (const ImageT &im)

Static Public Member Functions

- static VecT compute_Gauss_FIR_kernel (FloatT sigma, IdxT hw)
- static VecT compute_LoG_FIR_kernel (FloatT sigma, IdxT hw)

Public Attributes

- IdxT dim
- IVecT size
- VecT sigma
- IVecT hw

Static Protected Attributes

- static const IdxT max_kernel_hw
- static const FloatT default_sigma_hw_ratio

Friends

- template<class FloatT_ , class IdxT_ >
  std::ostream & operator<< (std::ostream &out, const GaussFilter3D< FloatT_, IdxT_ > &filt)

7.6.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::GaussFilter3D< FloatT, IdxT >

3D Filters

Definition at line 126 of file GaussFilter.h.

7.6.2 Member Typedef Documentation

7.6.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFilter3D< FloatT, IdxT >::ImageT = arma::Cube<FloatT>

Definition at line 131 of file GaussFilter.h.

7.6.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFilter3D< FloatT, IdxT >::IVecT = typename GaussFIRFilter<FloatT,IdxT>::IVecT

Definition at line 129 of file GaussFilter.h.

7.6.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFIRFilter< FloatT, IdxT >::MatT = arma::Mat<FloatT> [inherited]

Definition at line 26 of file GaussFilter.h.

7.6.2.4 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFilter3D< FloatT, IdxT >::VecT = typename GaussFIRFilter<FloatT,IdxT>::VecT

Definition at line 130 of file GaussFilter.h.

7.6.3 Constructor & Destructor Documentation

7.6.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::GaussFilter3D< FloatT, IdxT >::GaussFilter3D (const IVecT & *size,* const VecT & *sigma*)

7.6.3.2 template<class FloatT = float, class IdxT = uint32_t> boxxer::GaussFilter3D< FloatT, IdxT >::GaussFilter3D (const IVecT & *size,* const VecT & *sigma,* const IVecT & *kernel_hw*)

7.6.4 Member Function Documentation

7.6.4.1 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_Gauss_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.6.4.2 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_LoG_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.6.4.3 template<class FloatT = float, class IdxT = uint32_t> void boxxer::GaussFilter3D< FloatT, IdxT >::filter (const ImageT & *im,* ImageT & *out*)

7.6.4.4 template<class FloatT = float, class IdxT = uint32_t> ImageT boxxer::GaussFilter3D< FloatT, IdxT >::make_image ( ) const [inline]

Definition at line 136 of file GaussFilter.h.

References boxxer::GaussFIRFilter< FloatT, IdxT >::size.

7.6.4.5 template<class FloatT = float, class IdxT = uint32_t> void boxxer::GaussFilter3D< FloatT, IdxT >::set_kernel_hw (const IVecT & *kernel_half_width*) [virtual]

Implements boxxer::GaussFIRFilter< FloatT, IdxT >.

7.6.4.6 template<class FloatT = float, class IdxT = uint32_t> void boxxer::GaussFilter3D< FloatT, IdxT >::test_filter (const ImageT & *im*)

7.6.5 Friends And Related Function Documentation

7.6.5.1 template<class FloatT = float, class IdxT = uint32_t> template<class FloatT_ , class IdxT_ > std::ostream& operator<< (std::ostream & *out,* const GaussFilter3D< FloatT_, IdxT_ > & *filt*) [friend]

7.6.6 Member Data Documentation

7.6.6.1 template<class FloatT = float, class IdxT = uint32_t> const FloatT boxxer::GaussFIRFilter< FloatT, IdxT >::default_sigma_hw_ratio [static], [protected], [inherited]

Definition at line 41 of file GaussFilter.h.

7.6.6.2 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::dim [inherited]

Definition at line 28 of file GaussFilter.h.

7.6.6.3 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::hw [inherited]

Definition at line 31 of file GaussFilter.h.

7.6.6.4 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::max_kernel_hw [static], [protected], [inherited]

Definition at line 40 of file GaussFilter.h.

7.6.6.5 template<class FloatT = float, class IdxT = uint32_t> VecT boxxer::GaussFIRFilter< FloatT, IdxT >::sigma [inherited]

Definition at line 30 of file GaussFilter.h.

7.6.6.6 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::size [inherited]

Definition at line 29 of file GaussFilter.h.

Referenced by boxxer::GaussFilter2D< FloatT, IdxT >::make_image(), boxxer::DoGFilter2D< FloatT, IdxT >::make_image(), boxxer::LoGFilter2D< FloatT, IdxT >::make_image(), boxxer::GaussFilter3D< FloatT, IdxT >::make_image(), boxxer::DoGFilter3D< FloatT, IdxT >::make_image(), and boxxer::LoGFilter3D< FloatT, IdxT >::make_image().

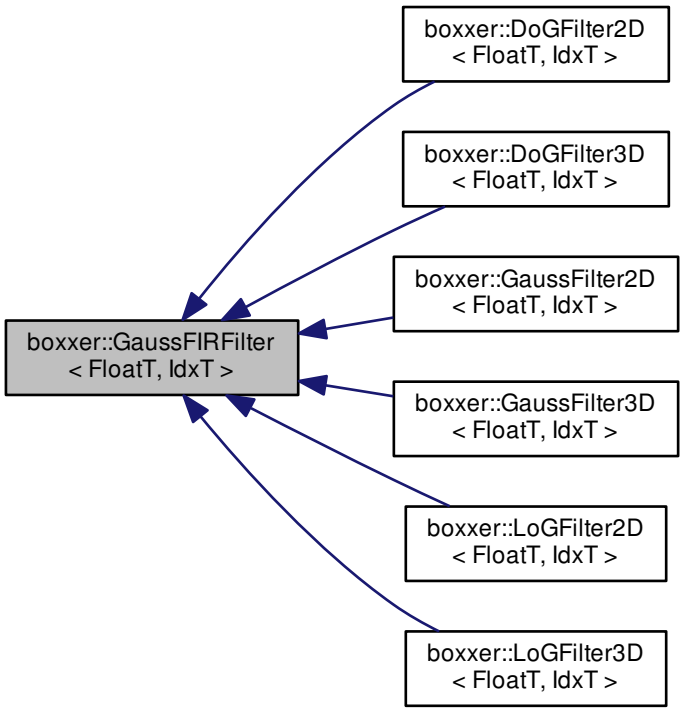
The documentation for this class was generated from the following file:

- GaussFilter.h

7.7 boxxer::GaussFIRFilter< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/GaussFilter.h>`

Inheritance diagram for boxxer::GaussFIRFilter< FloatT, IdxT >:



Public Types

- using IVecT = arma::Col< IdxT >
- using VecT = arma::Col< FloatT >
- using MatT = arma::Mat< FloatT >

Public Member Functions

- GaussFIRFilter (IdxT dim, const IVecT &size, const VecT &sigma)
- virtual void set_kernel_hw (const IVecT &kernel_half_width)=0

Static Public Member Functions

- static VecT compute_Gauss_FIR_kernel (FloatT sigma, IdxT hw)
- static VecT compute_LoG_FIR_kernel (FloatT sigma, IdxT hw)

Public Attributes

- IdxT dim
- IVecT size
- VecT sigma
- IVecT hw

Static Protected Attributes

- static const IdxT max_kernel_hw
- static const FloatT default_sigma_hw_ratio

7.7.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::GaussFIRFilter< FloatT, IdxT >

Base filters

Definition at line 21 of file GaussFilter.h.

7.7.2 Member Typedef Documentation

7.7.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFIRFilter< FloatT, IdxT >::IVecT = arma::Col<IdxT>

Definition at line 24 of file GaussFilter.h.

7.7.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFIRFilter< FloatT, IdxT >::MatT = arma::Mat<FloatT>

Definition at line 26 of file GaussFilter.h.

7.7.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFIRFilter< FloatT, IdxT >::VecT = arma::Col<FloatT>

Definition at line 25 of file GaussFilter.h.

7.7.3 Constructor & Destructor Documentation

7.7.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::GaussFIRFilter< FloatT, IdxT >::GaussFIRFilter (IdxT *dim,* const IVecT & *size,* const VecT & *sigma*)

7.7.4 Member Function Documentation

7.7.4.1 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_Gauss_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static]

7.7.4.2 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_LoG_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static]

7.7.4.3 template<class FloatT = float, class IdxT = uint32_t> virtual void boxxer::GaussFIRFilter< FloatT, IdxT >::set_kernel_hw (const IVecT & *kernel_half_width*) [pure virtual]

Implemented in boxxer::LoGFilter3D< FloatT, IdxT >, boxxer::DoGFilter3D< FloatT, IdxT >, boxxer::GaussFilter3D< FloatT, IdxT >, boxxer::LoGFilter2D< FloatT, IdxT >, boxxer::DoGFilter2D< FloatT, IdxT >, and boxxer::GaussFilter2D< FloatT, IdxT >.

7.7.5 Member Data Documentation

7.7.5.1 template<class FloatT = float, class IdxT = uint32_t> const FloatT boxxer::GaussFIRFilter< FloatT, IdxT >::default_sigma_hw_ratio [static], [protected]

Definition at line 41 of file GaussFilter.h.

7.7.5.2 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::dim

Definition at line 28 of file GaussFilter.h.

7.7.5.3 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::hw

Definition at line 31 of file GaussFilter.h.

7.7.5.4 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::max_kernel_hw [static], [protected]

Definition at line 40 of file GaussFilter.h.

7.7.5.5 template<class FloatT = float, class IdxT = uint32_t> VecT boxxer::GaussFIRFilter< FloatT, IdxT >::sigma

Definition at line 30 of file GaussFilter.h.

7.7.5.6 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::size

Definition at line 29 of file GaussFilter.h.

Referenced by boxxer::GaussFilter2D< FloatT, IdxT >::make_image(), boxxer::DoGFilter2D< FloatT, IdxT >::make_image(), boxxer::LoGFilter2D< FloatT, IdxT >::make_image(), boxxer::GaussFilter3D< FloatT, IdxT >::make_image(), boxxer::DoGFilter3D< FloatT, IdxT >::make_image(), and boxxer::LoGFilter3D< FloatT, IdxT >::make_image().

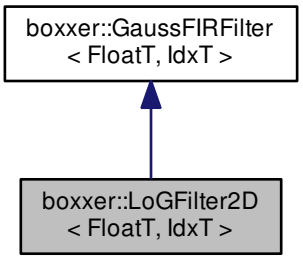
The documentation for this class was generated from the following file:

- GaussFilter.h

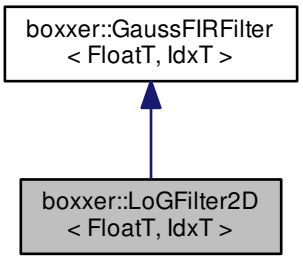
7.8 boxxer::LoGFilter2D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/GaussFilter.h>`

Inheritance diagram for boxxer::LoGFilter2D< FloatT, IdxT >:



Collaboration diagram for boxxer::LoGFilter2D< FloatT, IdxT >:



Public Types

- using IVecT = typename GaussFIRFilter< FloatT, IdxT >::IVecT
- using VecT = typename GaussFIRFilter< FloatT, IdxT >::VecT
- using ImageT = arma::Mat< FloatT >
- using MatT = arma::Mat< FloatT >

Public Member Functions

- LoGFilter2D (const IVecT &size, const VecT &sigma)
- LoGFilter2D (const IVecT &size, const VecT &sigma, const IVecT &kernel_hw)
- void set_kernel_hw (const IVecT &kernel_half_width)
- ImageT make_image () const
- void filter (const ImageT &im, ImageT &out)
- void test_filter (const ImageT &im)

Static Public Member Functions

- static VecT compute_Gauss_FIR_kernel (FloatT sigma, IdxT hw)
- static VecT compute_LoG_FIR_kernel (FloatT sigma, IdxT hw)

Public Attributes

- IdxT dim
- IVecT size
- VecT sigma
- IVecT hw

Static Protected Attributes

- static const IdxT max_kernel_hw
- static const FloatT default_sigma_hw_ratio

Friends

- template<class FloatT_ , class IdxT_ >
  std::ostream & operator<< (std::ostream &out, const LoGFilter2D< FloatT_, IdxT_ > &filt)

7.8.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::LoGFilter2D< FloatT, IdxT >

Definition at line 98 of file GaussFilter.h.

7.8.2 Member Typedef Documentation

7.8.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::LoGFilter2D< FloatT, IdxT >::ImageT = arma::Mat<FloatT>

Definition at line 103 of file GaussFilter.h.

7.8.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::LoGFilter2D< FloatT, IdxT >::IVecT = typename GaussFIRFilter<FloatT,IdxT>::IVecT

Definition at line 101 of file GaussFilter.h.

7.8.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFIRFilter< FloatT, IdxT >::MatT = arma::Mat<FloatT> [inherited]

Definition at line 26 of file GaussFilter.h.

7.8.2.4 template<class FloatT = float, class IdxT = uint32_t> using boxxer::LoGFilter2D< FloatT, IdxT >::VecT = typename GaussFIRFilter<FloatT,IdxT>::VecT

Definition at line 102 of file GaussFilter.h.

7.8.3 Constructor & Destructor Documentation

7.8.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::LoGFilter2D< FloatT, IdxT >::LoGFilter2D (const IVecT & *size,* const VecT & *sigma*)

7.8.3.2 template<class FloatT = float, class IdxT = uint32_t> boxxer::LoGFilter2D< FloatT, IdxT >::LoGFilter2D (const IVecT & *size,* const VecT & *sigma,* const IVecT & *kernel_hw*)

7.8.4 Member Function Documentation

7.8.4.1 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_Gauss_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.8.4.2 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_LoG_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.8.4.3 template<class FloatT = float, class IdxT = uint32_t> void boxxer::LoGFilter2D< FloatT, IdxT >::filter (const ImageT & *im,* ImageT & *out*)

7.8.4.4 template<class FloatT = float, class IdxT = uint32_t> ImageT boxxer::LoGFilter2D< FloatT, IdxT >::make_image ( ) const [inline]

Definition at line 108 of file GaussFilter.h.

References boxxer::GaussFIRFilter< FloatT, IdxT >::size.

7.8.4.5 template<class FloatT = float, class IdxT = uint32_t> void boxxer::LoGFilter2D< FloatT, IdxT >::set_kernel_hw (const IVecT & *kernel_half_width*) [virtual]

Implements boxxer::GaussFIRFilter< FloatT, IdxT >.

7.8.4.6 template<class FloatT = float, class IdxT = uint32_t> void boxxer::LoGFilter2D< FloatT, IdxT >::test_filter (const ImageT & *im*)

7.8.5 Friends And Related Function Documentation

7.8.5.1 template<class FloatT = float, class IdxT = uint32_t> template<class FloatT_ , class IdxT_ > std::ostream& operator<< (std::ostream & *out,* const LoGFilter2D< FloatT_, IdxT_ > & *filt*) [friend]

7.8.6 Member Data Documentation

7.8.6.1 template<class FloatT = float, class IdxT = uint32_t> const FloatT boxxer::GaussFIRFilter< FloatT, IdxT >::default_sigma_hw_ratio [static], [protected], [inherited]

Definition at line 41 of file GaussFilter.h.

7.8.6.2 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::dim [inherited]

Definition at line 28 of file GaussFilter.h.

7.8.6.3 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::hw [inherited]

Definition at line 31 of file GaussFilter.h.

7.8.6.4 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::max_kernel_hw [static], [protected], [inherited]

Definition at line 40 of file GaussFilter.h.

7.8.6.5 template<class FloatT = float, class IdxT = uint32_t> VecT boxxer::GaussFIRFilter< FloatT, IdxT >::sigma [inherited]

Definition at line 30 of file GaussFilter.h.

7.8.6.6 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::size [inherited]

Definition at line 29 of file GaussFilter.h.

Referenced by boxxer::GaussFilter2D< FloatT, IdxT >::make_image(), boxxer::DoGFilter2D< FloatT, IdxT >::make_↩ image(), boxxer::LoGFilter2D< FloatT, IdxT >::make_image(), boxxer::GaussFilter3D< FloatT, IdxT >::make_image(), boxxer::DoGFilter3D< FloatT, IdxT >::make_image(), and boxxer::LoGFilter3D< FloatT, IdxT >::make_image().

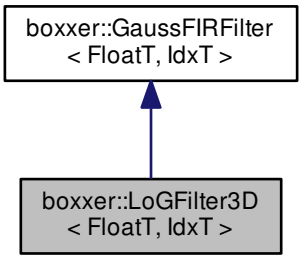
The documentation for this class was generated from the following file:

- GaussFilter.h

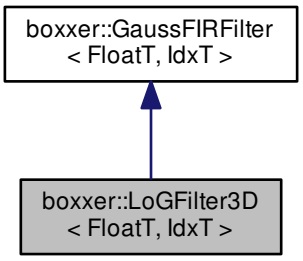
7.9 boxxer::LoGFilter3D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/GaussFilter.h>`

Inheritance diagram for boxxer::LoGFilter3D< FloatT, IdxT >:



Collaboration diagram for boxxer::LoGFilter3D< FloatT, IdxT >:



Public Types

- using IVecT = typename GaussFIRFilter< FloatT, IdxT >::IVecT
- using VecT = typename GaussFIRFilter< FloatT, IdxT >::VecT
- using ImageT = arma::Cube< FloatT >
- using MatT = arma::Mat< FloatT >

Public Member Functions

- LoGFilter3D (const IVecT &size, const VecT &sigma)
- LoGFilter3D (const IVecT &size, const VecT &sigma, const IVecT &kernel_hw)
- void set_kernel_hw (const IVecT &kernel_half_width)
- ImageT make_image () const
- void filter (const ImageT &im, ImageT &out)
- void test_filter (const ImageT &im)

Static Public Member Functions

- static VecT compute_Gauss_FIR_kernel (FloatT sigma, IdxT hw)
- static VecT compute_LoG_FIR_kernel (FloatT sigma, IdxT hw)

Public Attributes

- IdxT dim
- IVecT size
- VecT sigma
- IVecT hw

Static Protected Attributes

- static const IdxT max_kernel_hw
- static const FloatT default_sigma_hw_ratio

Friends

- template<class FloatT_ , class IdxT_ >
  std::ostream & operator<< (std::ostream &out, const LoGFilter3D< FloatT_, IdxT_ > &filt)

7.9.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::LoGFilter3D< FloatT, IdxT >

Definition at line 178 of file GaussFilter.h.

7.9.2 Member Typedef Documentation

7.9.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::LoGFilter3D< FloatT, IdxT >::ImageT = arma::Cube<FloatT>

Definition at line 183 of file GaussFilter.h.

7.9.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::LoGFilter3D< FloatT, IdxT >::IVecT = typename GaussFIRFilter<FloatT,IdxT>::IVecT

Definition at line 181 of file GaussFilter.h.

7.9.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::GaussFIRFilter< FloatT, IdxT >::MatT = arma::Mat<FloatT> [inherited]

Definition at line 26 of file GaussFilter.h.

7.9.2.4 template<class FloatT = float, class IdxT = uint32_t> using boxxer::LoGFilter3D< FloatT, IdxT >::VecT = typename GaussFIRFilter<FloatT,IdxT>::VecT

Definition at line 182 of file GaussFilter.h.

7.9.3 Constructor & Destructor Documentation

7.9.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::LoGFilter3D< FloatT, IdxT >::LoGFilter3D (const IVecT & *size,* const VecT & *sigma*)

7.9.3.2 template<class FloatT = float, class IdxT = uint32_t> boxxer::LoGFilter3D< FloatT, IdxT >::LoGFilter3D (const IVecT & *size,* const VecT & *sigma,* const IVecT & *kernel_hw*)

7.9.4 Member Function Documentation

7.9.4.1 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_Gauss_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.9.4.2 template<class FloatT = float, class IdxT = uint32_t> static VecT boxxer::GaussFIRFilter< FloatT, IdxT >::compute_LoG_FIR_kernel (FloatT *sigma,* IdxT *hw*) [static], [inherited]

7.9.4.3 template<class FloatT = float, class IdxT = uint32_t> void boxxer::LoGFilter3D< FloatT, IdxT >::filter (const ImageT & *im,* ImageT & *out*)

7.9.4.4 template<class FloatT = float, class IdxT = uint32_t> ImageT boxxer::LoGFilter3D< FloatT, IdxT >::make_image ( ) const [inline]

Definition at line 188 of file GaussFilter.h.

References boxxer::GaussFIRFilter< FloatT, IdxT >::size.

7.9.4.5 template<class FloatT = float, class IdxT = uint32_t> void boxxer::LoGFilter3D< FloatT, IdxT >::set_kernel_hw (const IVecT & *kernel_half_width*) [virtual]

Implements boxxer::GaussFIRFilter< FloatT, IdxT >.

7.9.4.6 template<class FloatT = float, class IdxT = uint32_t> void boxxer::LoGFilter3D< FloatT, IdxT >::test_filter (const ImageT & *im*)

7.9.5 Friends And Related Function Documentation

7.9.5.1 template<class FloatT = float, class IdxT = uint32_t> template<class FloatT_ , class IdxT_ > std::ostream& operator<< (std::ostream & *out,* const LoGFilter3D< FloatT_, IdxT_ > & *filt*) [friend]

7.9.6 Member Data Documentation

7.9.6.1 template<class FloatT = float, class IdxT = uint32_t> const FloatT boxxer::GaussFIRFilter< FloatT, IdxT >::default_sigma_hw_ratio [static], [protected], [inherited]

Definition at line 41 of file GaussFilter.h.

7.9.6.2 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::dim [inherited]

Definition at line 28 of file GaussFilter.h.

7.9.6.3 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::hw [inherited]

Definition at line 31 of file GaussFilter.h.

7.9.6.4 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::GaussFIRFilter< FloatT, IdxT >::max_kernel_hw [static], [protected], [inherited]

Definition at line 40 of file GaussFilter.h.

7.9.6.5 template<class FloatT = float, class IdxT = uint32_t> VecT boxxer::GaussFIRFilter< FloatT, IdxT >::sigma [inherited]

Definition at line 30 of file GaussFilter.h.

7.9.6.6 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::GaussFIRFilter< FloatT, IdxT >::size [inherited]

Definition at line 29 of file GaussFilter.h.

Referenced by boxxer::GaussFilter2D< FloatT, IdxT >::make_image(), boxxer::DoGFilter2D< FloatT, IdxT >::make_image(), boxxer::LoGFilter2D< FloatT, IdxT >::make_image(), boxxer::GaussFilter3D< FloatT, IdxT >::make_image(), boxxer::DoGFilter3D< FloatT, IdxT >::make_image(), and boxxer::LoGFilter3D< FloatT, IdxT >::make_image().

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

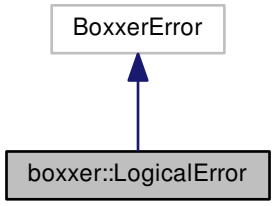
- GaussFilter.h

7.10 boxxer::LogicalError Struct Reference

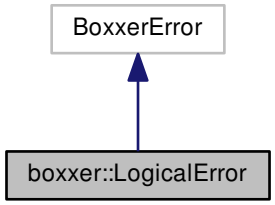
Internal logical error. Bad logic or broken promises.

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/BoxxerError.h>`

Inheritance diagram for boxxer::LogicalError:



Collaboration diagram for boxxer::LogicalError:



Public Member Functions

- LogicalError (std::string message)

7.10.1 Detailed Description

Internal logical error. Bad logic or broken promises.

Definition at line 32 of file BoxxerError.h.

7.10.2 Constructor & Destructor Documentation

7.10.2.1 boxxer::LogicalError::LogicalError (std::string *message*) [inline]

Definition at line 34 of file BoxxerError.h.

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

- BoxxerError.h

7.11 boxxer::Maxima2D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/Maxima.h>`

Public Types

- using IVecT = arma::Col< IdxT >
- using IMatT = arma::Mat< IdxT >
- using VecT = arma::Col< FloatT >
- using ImageT = arma::Mat< FloatT >

Public Member Functions

- Maxima2D (const IVecT &sizeX, IdxT boxsize=MinBoxsize)
- IdxT find_maxima (const ImageT &im)
- IdxT find_maxima (const ImageT &im, IMatT &maxima_out, VecT &max_vals_out)
- void read_maxima (IdxT Nmaxima, IMatT &maxima_out, VecT &max_vals_out) const
- void test_maxima (const ImageT &im)
- bool check_maxima (const ImageT &im, IdxT x, IdxT y, IdxT neigborhoodSize=MinBoxsize)

Public Attributes

- IVecT size
- IdxT boxsize

Static Public Attributes

- static const IdxT MinBoxsize
- static const IdxT Ndim

7.11.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::Maxima2D< FloatT, IdxT >

Definition at line 16 of file Maxima.h.

7.11.2 Member Typedef Documentation

7.11.2.1 template<class FloatT = float, class IdxT = uint32_t> using **boxxer::Maxima2D**< FloatT, IdxT >::**ImageT** = arma::Mat<FloatT>

Definition at line 22 of file Maxima.h.

7.11.2.2 template<class FloatT = float, class IdxT = uint32_t> using **boxxer::Maxima2D**< FloatT, IdxT >::**IMatT** = arma::Mat<IdxT>

Definition at line 20 of file Maxima.h.

7.11.2.3 template<class FloatT = float, class IdxT = uint32_t> using **boxxer::Maxima2D**< FloatT, IdxT >::**IVecT** = arma::Col<IdxT>

Definition at line 19 of file Maxima.h.

7.11.2.4 template<class FloatT = float, class IdxT = uint32_t> using **boxxer::Maxima2D**< FloatT, IdxT >::**VecT** = arma::Col<FloatT>

Definition at line 21 of file Maxima.h.

7.11.3 Constructor & Destructor Documentation

7.11.3.1 template<class FloatT = float, class IdxT = uint32_t> **boxxer::Maxima2D**< FloatT, IdxT >::**Maxima2D** (const **IVecT** & *sizeX,* IdxT *boxsize* = **MinBoxsize**)

7.11.4 Member Function Documentation

7.11.4.1 template<class FloatT = float, class IdxT = uint32_t> bool **boxxer::Maxima2D**< FloatT, IdxT >::check_maxima (const **ImageT** & *im,* IdxT *x,* IdxT *y,* IdxT *neigborhoodSize* = **MinBoxsize**)

7.11.4.2 template<class FloatT = float, class IdxT = uint32_t> IdxT **boxxer::Maxima2D**< FloatT, IdxT >::find_maxima (const **ImageT** & *im*)

7.11.4.3 template<class FloatT = float, class IdxT = uint32_t> IdxT **boxxer::Maxima2D**< FloatT, IdxT >::find_maxima (const **ImageT** & *im,* **IMatT** & *maxima_out,* **VecT** & *max_vals_out*)

7.11.4.4 template<class FloatT = float, class IdxT = uint32_t> void **boxxer::Maxima2D**< FloatT, IdxT >::read_maxima (IdxT *Nmaxima,* **IMatT** & *maxima_out,* **VecT** & *max_vals_out*) const

7.11.4.5 template<class FloatT = float, class IdxT = uint32_t> void **boxxer::Maxima2D**< FloatT, IdxT >::test_maxima (const **ImageT** & *im*)

7.11.5 Member Data Documentation

7.11.5.1 template<class FloatT = float, class IdxT = uint32_t> IdxT **boxxer::Maxima2D**< FloatT, IdxT >::boxsize

Definition at line 27 of file Maxima.h.

7.11.5.2 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::Maxima2D< FloatT, IdxT >::MinBoxsize [static]

Definition at line 23 of file Maxima.h.

7.11.5.3 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::Maxima2D< FloatT, IdxT >::Ndim [static]

Definition at line 24 of file Maxima.h.

7.11.5.4 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::Maxima2D< FloatT, IdxT >::size

Definition at line 26 of file Maxima.h.

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

- Maxima.h

7.12 boxxer::Maxima3D< FloatT, IdxT > Class Template Reference

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/Maxima.h>`

Public Types

- using IVecT = arma::Col< IdxT >
- using IMatT = arma::Mat< IdxT >
- using ICubeT = arma::Cube< IdxT >
- using VecT = arma::Col< FloatT >
- using ImageT = arma::Cube< FloatT >

Public Member Functions

- Maxima3D (const IVecT &size, IdxT boxsize=MinBoxsize)
- IdxT find_maxima (const ImageT &im)
- IdxT find_maxima (const ImageT &im, IMatT &maxima_out, VecT &max_vals_out)
- void read_maxima (IMatT &maxima_out, VecT &max_vals_out) const
- void test_maxima (const ImageT &im)
- bool check_maxima (const ImageT &im, IdxT x, IdxT y, IdxT z, IdxT neigborhoodSize=MinBoxsize)

Public Attributes

- IVecT size
- IdxT boxsize

Static Public Attributes

- static const IdxT MinBoxsize
- static const IdxT Ndim

7.12.1 Detailed Description

template<class FloatT = float, class IdxT = uint32_t>
class boxxer::Maxima3D< FloatT, IdxT >

Definition at line 52 of file Maxima.h.

7.12.2 Member Typedef Documentation

7.12.2.1 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Maxima3D< FloatT, IdxT >::ICubeT = arma::Cube<IdxT>

Definition at line 57 of file Maxima.h.

7.12.2.2 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Maxima3D< FloatT, IdxT >::ImageT = arma::Cube<FloatT>

Definition at line 59 of file Maxima.h.

7.12.2.3 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Maxima3D< FloatT, IdxT >::IMatT = arma::Mat<IdxT>

Definition at line 56 of file Maxima.h.

7.12.2.4 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Maxima3D< FloatT, IdxT >::IVecT = arma::Col<IdxT>

Definition at line 55 of file Maxima.h.

7.12.2.5 template<class FloatT = float, class IdxT = uint32_t> using boxxer::Maxima3D< FloatT, IdxT >::VecT = arma::Col<FloatT>

Definition at line 58 of file Maxima.h.

7.12.3 Constructor & Destructor Documentation

7.12.3.1 template<class FloatT = float, class IdxT = uint32_t> boxxer::Maxima3D< FloatT, IdxT >::Maxima3D (const IVecT & *size,* IdxT *boxsize* = MinBoxsize)

7.12.4 Member Function Documentation

7.12.4.1 template<class FloatT = float, class IdxT = uint32_t> bool boxxer::Maxima3D< FloatT, IdxT >::check_maxima (const ImageT & *im,* IdxT *x,* IdxT *y,* IdxT *z,* IdxT *neigborhoodSize* = MinBoxsize)

7.12.4.2 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::Maxima3D< FloatT, IdxT >::find_maxima (const ImageT & *im*)

7.12.4.3 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::Maxima3D< FloatT, IdxT >::find_maxima (const ImageT & *im,* IMatT & *maxima_out,* VecT & *max_vals_out*)

7.12.4.4 template<class FloatT = float, class IdxT = uint32_t> void boxxer::Maxima3D< FloatT, IdxT >::read_maxima (IMatT & *maxima_out,* VecT & *max_vals_out*) const

7.12.4.5 template<class FloatT = float, class IdxT = uint32_t> void boxxer::Maxima3D< FloatT, IdxT >::test_maxima (const ImageT & *im*)

7.12.5 Member Data Documentation

7.12.5.1 template<class FloatT = float, class IdxT = uint32_t> IdxT boxxer::Maxima3D< FloatT, IdxT >::boxsize

Definition at line 65 of file Maxima.h.

7.12.5.2 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::Maxima3D< FloatT, IdxT >::MinBoxsize [static]

Definition at line 61 of file Maxima.h.

7.12.5.3 template<class FloatT = float, class IdxT = uint32_t> const IdxT boxxer::Maxima3D< FloatT, IdxT >::Ndim [static]

Definition at line 62 of file Maxima.h.

7.12.5.4 template<class FloatT = float, class IdxT = uint32_t> IVecT boxxer::Maxima3D< FloatT, IdxT >::size

Definition at line 64 of file Maxima.h.

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

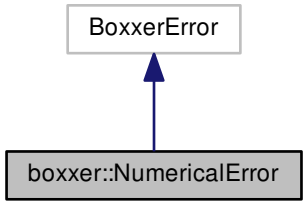
- Maxima.h

7.13 boxxer::NumericalError Struct Reference

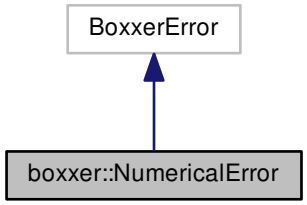
Internal numerical error.

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/BoxxerError.h>`

Inheritance diagram for boxxer::NumericalError:



Collaboration diagram for boxxer::NumericalError:



Public Member Functions

- NumericalError (std::string message)

7.13.1 Detailed Description

Internal numerical error.

Definition at line 39 of file BoxxerError.h.

7.13.2 Constructor & Destructor Documentation

7.13.2.1 boxxer::NumericalError::NumericalError (std::string *message*) [inline]

Definition at line 41 of file BoxxerError.h.

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

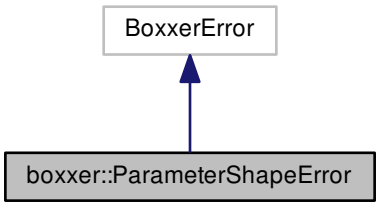
- BoxxerError.h

7.14 boxxer::ParameterShapeError Struct Reference

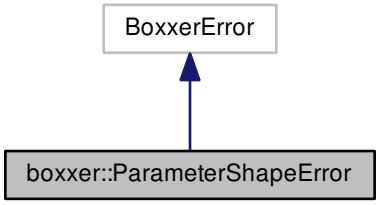
Parameters are the incorrect shape, size or number of dimensions.

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/BoxxerError.h>`

Inheritance diagram for boxxer::ParameterShapeError:



Collaboration diagram for boxxer::ParameterShapeError:



Public Member Functions

- ParameterShapeError (std::string message)

7.14.1 Detailed Description

Parameters are the incorrect shape, size or number of dimensions.

Definition at line 25 of file BoxxerError.h.

7.14.2 Constructor & Destructor Documentation

7.14.2.1 boxxer::ParameterShapeError::ParameterShapeError (std::string *message*) [inline]

Definition at line 27 of file BoxxerError.h.

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

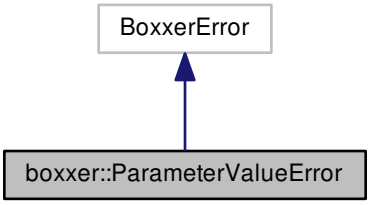
- BoxxerError.h

7.15 boxxer::ParameterValueError Struct Reference

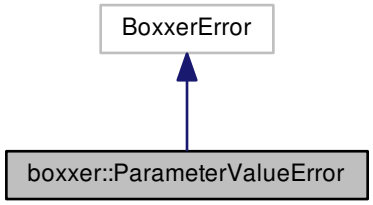
Parameter value is not valid.

`#include </home/travis/build/markjolah/Boxxer/include/Boxxer/BoxxerError.h>`

Inheritance diagram for boxxer::ParameterValueError:



Collaboration diagram for boxxer::ParameterValueError:



Public Member Functions

- ParameterValueError (std::string message)

7.15.1 Detailed Description

Parameter value is not valid.

Definition at line 18 of file BoxxerError.h.

7.15.2 Constructor & Destructor Documentation

7.15.2.1 boxxer::ParameterValueError::ParameterValueError (std::string *message*) [inline]

Definition at line 20 of file BoxxerError.h.

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

- BoxxerError.h

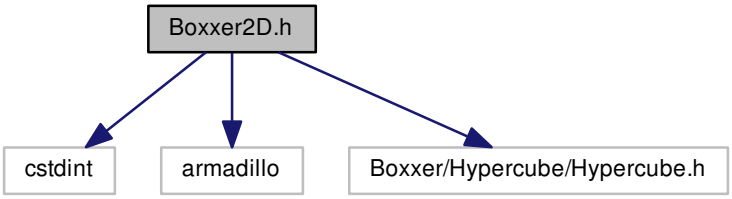
8 File Documentation

8.1 Boxxer2D.h File Reference

The class declaration for Boxxer2D.

```
#include <cstdint>
#include <armadillo>
#include "Boxxer/Hypercube/Hypercube.h"
```

Include dependency graph for Boxxer2D.h:



Classes

- class boxxer::Boxxer2D< FloatT, IdxT >

Namespaces

- boxxer

8.1.1 Detailed Description

The class declaration for Boxxer2D.

Author

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

Date

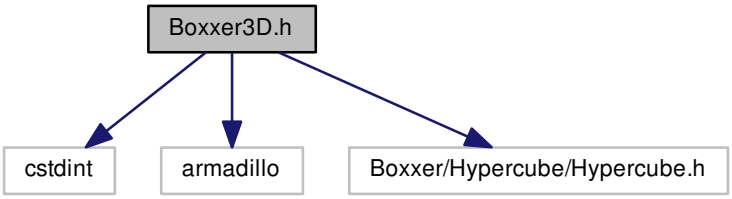
2014-2019

8.2 Boxxer3D.h File Reference

The class declaration for Boxxer3D.

```
#include <cstdint>
#include <armadillo>
#include "Boxxer/Hypercube/Hypercube.h"
```

Include dependency graph for Boxxer3D.h:



Classes

- class boxxer::Boxxer3D< FloatT, IdxT >

Namespaces

- boxxer

8.2.1 Detailed Description

The class declaration for Boxxer3D.

Author

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

Date

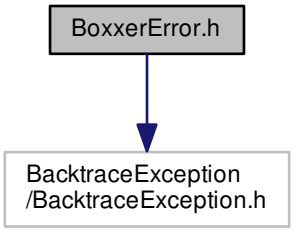
2014-2019

8.3 BoxxerError.h File Reference

Error handling.

```
#include "BacktraceException/BacktraceException.h"
```

Include dependency graph for BoxxerError.h:



Classes

- struct boxxer::ParameterValueError

  Parameter value is not valid.
- struct boxxer::ParameterShapeError

  Parameters are the incorrect shape, size or number of dimensions.
- struct boxxer::LogicalError

  Internal logical error. Bad logic or broken promises.
- struct boxxer::NumericalError

  Internal numerical error.

Namespaces

- boxxer

Typedefs

- using boxxer::BoxxerError = backtrace_exception::BacktraceException

8.3.1 Detailed Description

Error handling.

Author

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

Date

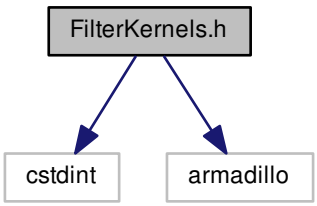
2014-2019

8.4 FilterKernels.h File Reference

The boxxer::kernels namespace - low-level Gaussian finite-impulse response filters.

```
#include <cstdint>
#include <armadillo>
```

Include dependency graph for FilterKernels.h:



Namespaces

- boxxer
- boxxer::kernels

Functions

1D Gauss FIR Filters

1D Gaussian finite-impulse response filters.

- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_1D (IntT size, const FloatT data[], FloatT fdata[], IntT hw, const FloatT kernel[])
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_1D (const arma::Col< FloatT > &data, arma::Col< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_1D_small (IntT size, const FloatT data[], FloatT fdata[], IntT hw, const FloatT kernel[])
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_1D_arma (const arma::Col< FloatT > &data, arma::Col< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_1D_inplace_arma (arma::Col< FloatT > &data, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_1D_inplace (IntT size, FloatT data[], IntT hw, const FloatT kernel[])

2D Gauss FIR Filters

2D Gaussian finite-impulse response filters.

- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_2Dx (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_2Dx_small (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_2Dx_arma (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_2Dy (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_2Dy_rowmajor (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_2Dy_colmajor (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_2Dy_small (const arma::Mat< FloatT > &data, arma::Mat< FloatT > &fdata, const arma::Col< FloatT > &kernel)

3D Gauss FIR Filters

3D Gaussian finite-impulse response filters.

- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_3Dx (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_3Dx_small (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_3Dy (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_3Dy_small (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_3Dz (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)
- template<class FloatT = float, class IntT = int32_t>
  void boxxer::kernels::gaussFIR_3Dz_small (const arma::Cube< FloatT > &data, arma::Cube< FloatT > &fdata, const arma::Col< FloatT > &kernel)

8.4.1 Detailed Description

The boxxer::kernels namespace - low-level Gaussian finite-impulse response filters.

Author

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

Date

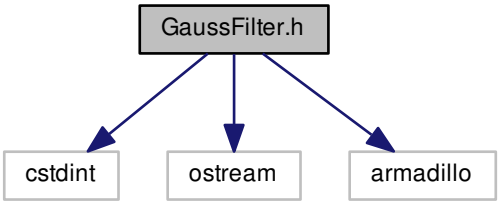
2014-2019

8.5 GaussFilter.h File Reference

The class declarations for Gaussian image filter classes.

```
#include <cstdint>
#include <ostream>
#include <armadillo>
```

Include dependency graph for GaussFilter.h:



Classes

- class boxxer::GaussFIRFilter< FloatT, IdxT >
- class boxxer::GaussFilter2D< FloatT, IdxT >
- class boxxer::DoGFilter2D< FloatT, IdxT >
- class boxxer::LoGFilter2D< FloatT, IdxT >
- class boxxer::GaussFilter3D< FloatT, IdxT >
- class boxxer::DoGFilter3D< FloatT, IdxT >
- class boxxer::LoGFilter3D< FloatT, IdxT >

Namespaces

- boxxer

8.5.1 Detailed Description

The class declarations for Gaussian image filter classes.

Author

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

Date

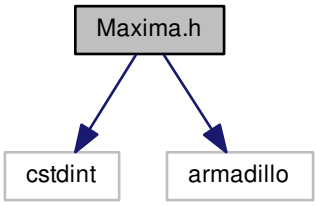
2014-2019 These classes are meant to be a per-thread worker class or a direct interface for single threaded processes. Each object has its own local storage of which is only 1 or 2 frames in size.

8.6 Maxima.h File Reference

The class declaration for the local maxima finders Maxima2D and Maxima3D.

```
#include <cstdint>
#include <armadillo>
```

Include dependency graph for Maxima.h:



Classes

- class boxxer::Maxima2D< FloatT, IdxT >
- class boxxer::Maxima3D< FloatT, IdxT >

Namespaces

- boxxer

8.6.1 Detailed Description

The class declaration for the local maxima finders Maxima2D and Maxima3D.

Author

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

Date

2014-2019

8.7 README.md File Reference

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