

## Parallel Bayesian Toolbox

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# Chapter 1

## Hierarchical Index

### 1.1 Class Hierarchy

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

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## Chapter 2

# Class Index

### 2.1 Class List

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

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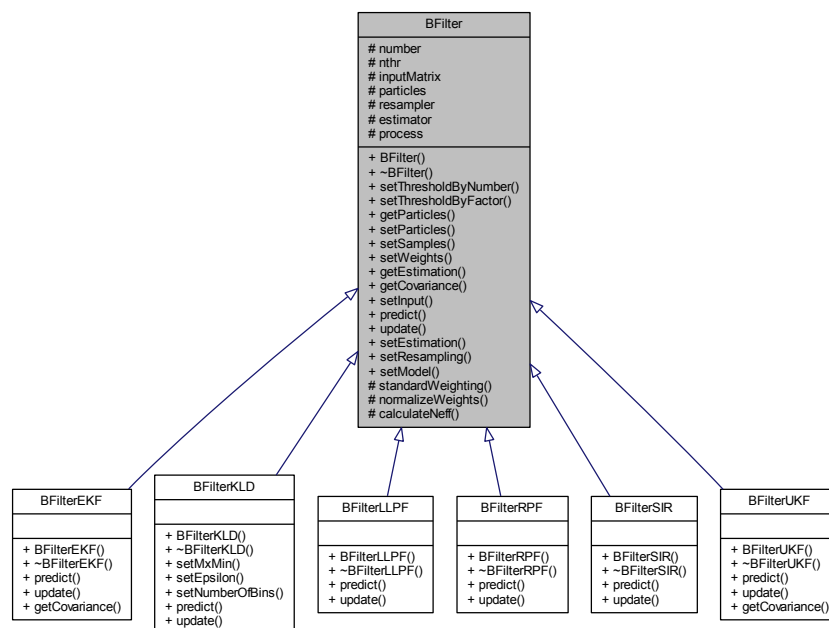
## Chapter 3

# Class Documentation

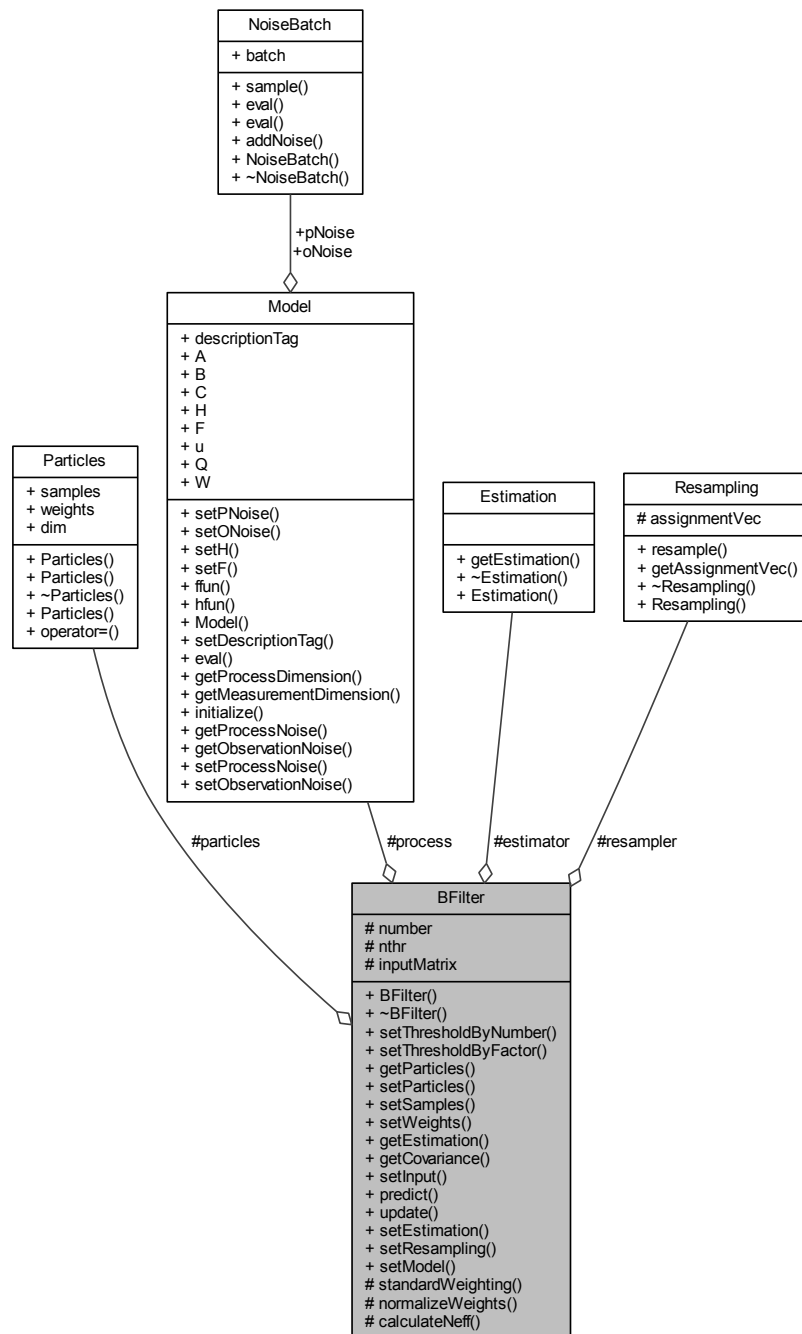
### 3.1 BFilter Class Reference

```
#include <bf.h>
```

Inheritance diagram for BFilter:



Collaboration diagram for BFilter:



## Public Member Functions

- void [setThresholdByNumber](#) (unsigned int)
- void [setThresholdByFactor](#) (float)
- [Particles](#) [getParticles](#) ()
- void [setParticles](#) (fmat, frowvec)
- void [setSamples](#) (fmat)

- void [setWeights](#) (frowvec)
- fvec [getEstimation](#) ()
- fmat [getCovariance](#) ()
- void **setInput** (fvec)
- virtual void [predict](#) ()
- virtual void [update](#) (fvec)
- void [setEstimation](#) ([Estimation](#) \*)
- void [setResampling](#) ([Resampling](#) \*)
- void [setModel](#) ([Model](#) \*)

### Protected Member Functions

- void [standardWeighting](#) ()
- void [normalizeWeights](#) ()
- float [calculateNeff](#) ()

### Protected Attributes

- unsigned int **number**
- unsigned int **nthr**
- fmat **inputMatrix**
- [Particles](#) **particles**
- [Resampling](#) \* **resampler**
- [Estimation](#) \* **estimator**
- [Model](#) \* **process**

#### 3.1.1 Detailed Description

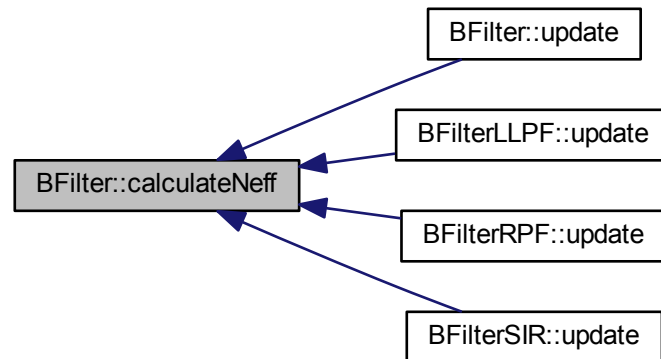
Bayes Filter base class implementing a simple SIS particle filter

#### 3.1.2 Member Function Documentation

##### 3.1.2.1 float BFilter::calculateNeff ( ) [protected]

calculate  $N_{eff} = \frac{1}{\text{sum}(\text{weight}^2)}$

Here is the caller graph for this function:



### 3.1.2.2 fmat BFilter::getCovariance ( )

Returns the current covariance matrix. Either it computes the covariance matrix by calculating it or returning the on-line computed covariance matrix of a Kalman Filter

Here is the caller graph for this function:



### 3.1.2.3 fvec BFilter::getEstimation ( )

returns the estimation of current state using the defined estimation method

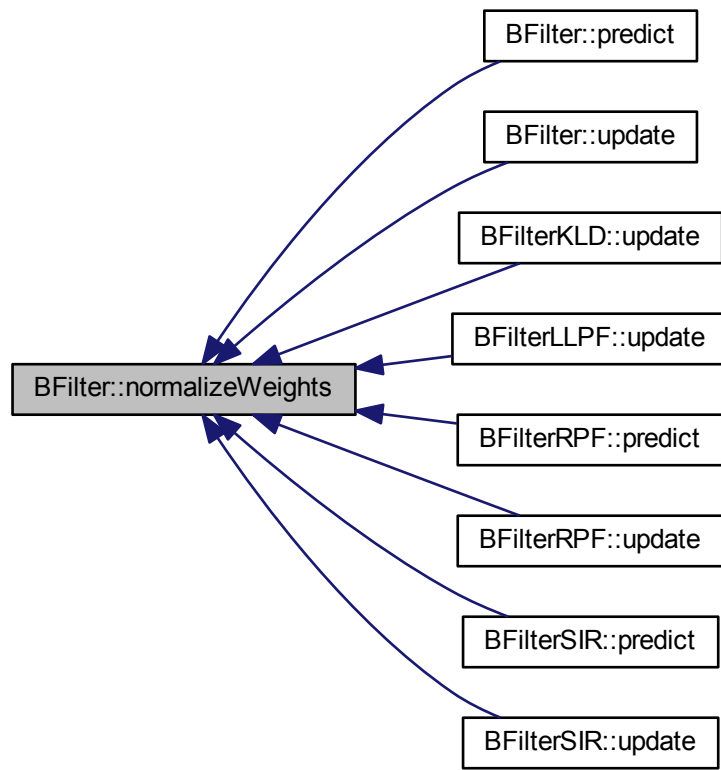
### 3.1.2.4 Particles BFilter::getParticles ( )

Returns the current set of particles including samples and weights

### 3.1.2.5 void BFilter::normalizeWeights ( ) [protected]

calculate weights so that sum of all weights equals 1

Here is the caller graph for this function:



#### 3.1.2.6 void BFilter::predict ( ) [virtual]

pressing prediction step including a temporary estimation

Reimplemented in [BFilterUKF](#), [BFilterKLD](#), [BFilterLLPF](#), [BFilterEKF](#), [BFilterRPF](#), and [BFilterSIR](#).

Here is the call graph for this function:



#### 3.1.2.7 void BFilter::setEstimation ( Estimation \* newEstimator )

Set estimation method

### 3.1.2.8 void BFilter::setModel ( Model \* newModel )

Set model used for particle generation

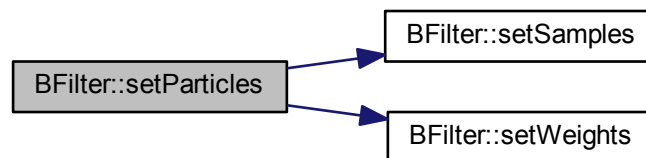
### 3.1.2.9 void BFilter::setParticles ( fmat newSamples, frowvec newWeights )

sets the particle set to a defined state

#### Parameters

<i>samples</i>	matrix of particles approximating a defined state
<i>weights</i>	vector of weights corresponing to the set of particles

Here is the call graph for this function:



### 3.1.2.10 void BFilter::setResampling ( Resampling \* newResampler )

Set resampling method

### 3.1.2.11 void BFilter::setSamples ( fmat newSamples )

define a new set of particles

#### Parameters

<i>samples</i>	matrix of particles approximating a defined state
----------------	---

Here is the caller graph for this function:





### 3.1.2.12 void BFilter::setThresholdByFactor ( float *newThreshold* )

Set number of particles. If the number of particles is reset all particles represent a zero vector and have standard weights. sets the threshold for resampling as a factor from 0 to 1. It is internally multiplied with the number of existing particles

### 3.1.2.13 void BFilter::setThresholdByNumber ( unsigned int *newThreshold* )

methods to manipulate the particles set, e.g. number of particles or weights  
sets the resampling threshold as a defined number of particles

### 3.1.2.14 void BFilter::setWeights ( frowvec *newWeights* )

sets a new vector of weights

#### Parameters

<i>weights</i>	vector of weights corresponing to the set of particles
----------------	--

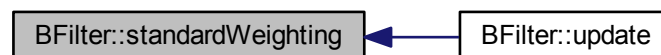
Here is the caller graph for this function:



### 3.1.2.15 void BFilter::standardWeighting ( ) [protected]

Weights all particles with the same value  $1/\text{numberOfParticles}$

Here is the caller graph for this function:

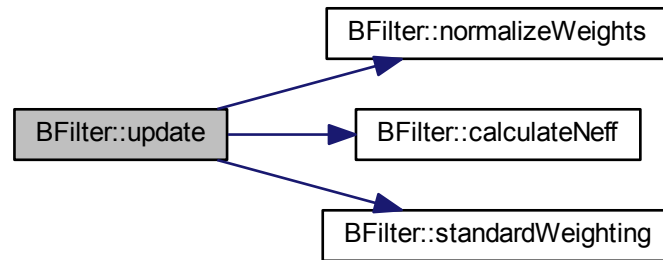


### 3.1.2.16 void BFilter::update ( fvec *measurement* ) [virtual]

processing update step including resampling if possible

Reimplemented in [BFilterUKF](#), [BFilterKLD](#), [BFilterLLPF](#), [BFilterEKF](#), [BFilterRPF](#), and [BFilterSIR](#).

Here is the call graph for this function:



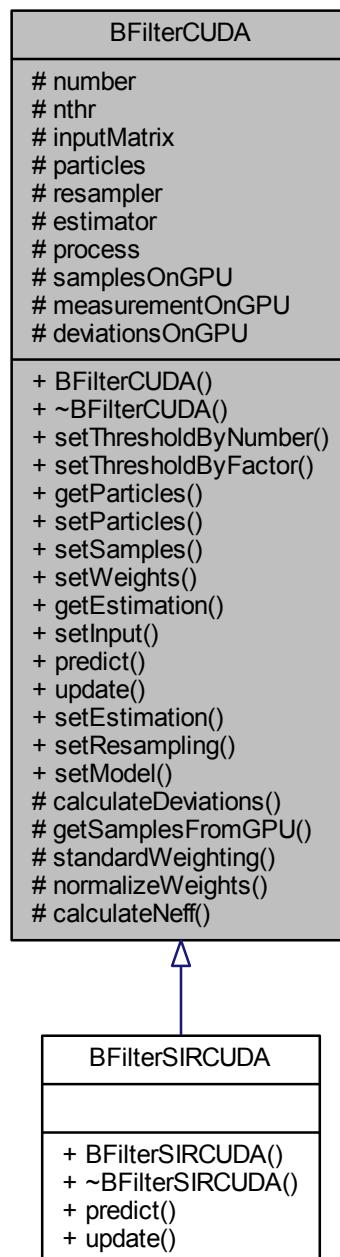
The documentation for this class was generated from the following files:

- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf.cpp`

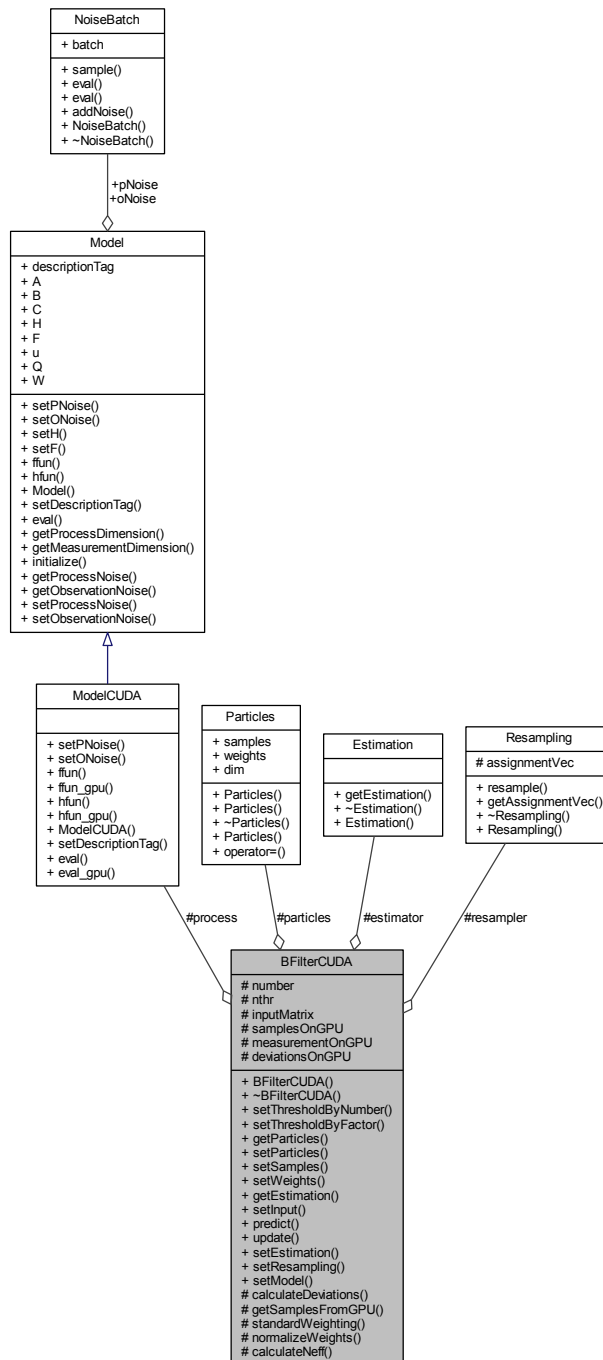
## 3.2 BFilterCUDA Class Reference

```
#include <bf_cuda.h>
```

Inheritance diagram for BFilterCUDA:



Collaboration diagram for BFilterCUDA:



## Public Member Functions

- void [setThresholdByNumber](#) (unsigned int)
- void [setThresholdByFactor](#) (float)
- [Particles](#) [getParticles](#) ()
- void [setParticles](#) (fmat, frowvec)
- void [setSamples](#) (fmat)

- void [setWeights](#) (frowvec)
- fvec [getEstimation](#) ()
- void [setInput](#) (fvec)
- virtual void [predict](#) ()
- virtual void [update](#) (fvec)
- void [setEstimation](#) ([Estimation](#) \*)
- void [setResampling](#) ([Resampling](#) \*)
- void [setModel](#) ([ModelCUDA](#) \*)

### Protected Member Functions

- void [calculateDeviations](#) (float \*measurement)
- fmat [getSamplesFromGPU](#) ()
- void [standardWeighting](#) ()
- void [normalizeWeights](#) ()
- float [calculateNeff](#) ()

### Protected Attributes

- unsigned int [number](#)
- unsigned int [nthr](#)
- fmat [inputMatrix](#)
- [Particles](#) [particles](#)
- [Resampling](#) \* [resampler](#)
- [Estimation](#) \* [estimator](#)
- [ModelCUDA](#) \* [process](#)
- float \* [samplesOnGPU](#)
- float \* [measurementOnGPU](#)
- float \* [deviationsOnGPU](#)

#### 3.2.1 Detailed Description

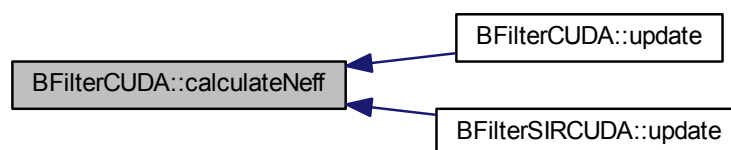
GPU accelerated Bayes Filter base class implementing a simple SIS particle filter

#### 3.2.2 Member Function Documentation

##### 3.2.2.1 float BFilterCUDA::calculateNeff ( ) [protected]

calculate  $N_{eff} = \frac{1}{\sum(weight^2)}$

Here is the caller graph for this function:



### 3.2.2.2 Particles BFilterCUDA::getParticles ( )

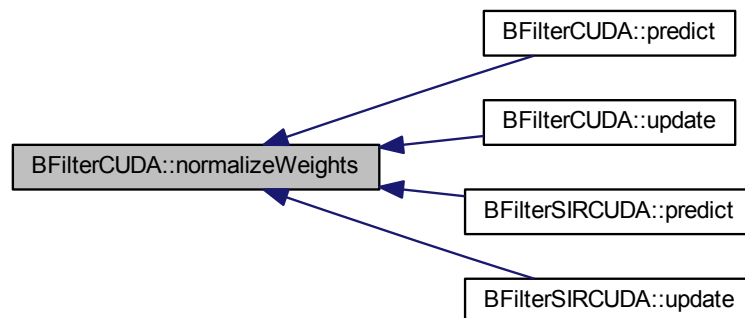
gives the current set of particles including samples and weights

Reads the particles object

### 3.2.2.3 void BFilterCUDA::normalizeWeights ( ) [protected]

calculate weights so that sum of all weights equals 1

Here is the caller graph for this function:



### 3.2.2.4 void BFilterCUDA::predict ( ) [virtual]

pressing prediction step including a temporary estimation

Reimplemented in [BFilterSIRCUDA](#).

Here is the call graph for this function:



### 3.2.2.5 void BFilterCUDA::setEstimation ( Estimation \* newEstimator )

Set estimation method

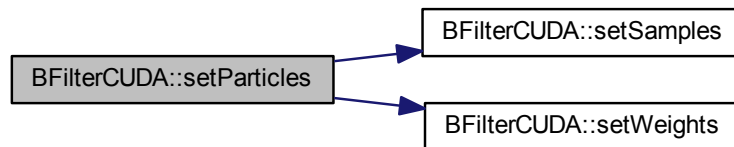
### 3.2.2.6 void BFilterCUDA::setModel ( ModelCUDA \* newModel )

Set model used for particle generation

### 3.2.2.7 void BFilterCUDA::setParticles ( fmat *newSamples*, frowvec *newWeights* )

Manipulate the particles including samples and their weights

Here is the call graph for this function:



### 3.2.2.8 void BFilterCUDA::setResampling ( Resampling \* *newResampler* )

Set resampling method

### 3.2.2.9 void BFilterCUDA::setSamples ( fmat *newSamples* )

Manipulate only the samples of the particles object

Here is the caller graph for this function:



### 3.2.2.10 void BFilterCUDA::setThresholdByFactor ( float *newThreshold* )

sets the threshold for resampling as a factor from 0 to 1. It is multiplied with the number of existing particles

Set number of particles. If the number of particles is reset all particles represent a zero vector and have standard weights. set threshold from 0 to 1

### 3.2.2.11 void BFilterCUDA::setThresholdByNumber ( unsigned int *newThreshold* )

methods to manipulate the particles set, e.g. number of particles or weights sets the resampling threshold as a defined number of particles

set threshold as a defined number

### 3.2.2.12 void BFilterCUDA::setWeights ( frowvec *newWeights* )

Manipulate only the weights of the partilces object

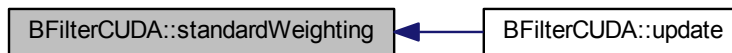
Here is the caller graph for this function:



### 3.2.2.13 void BFilterCUDA::standardWeighting ( ) [protected]

Weights all particles with the same value  $1/\text{numberOfParticles}$

Here is the caller graph for this function:

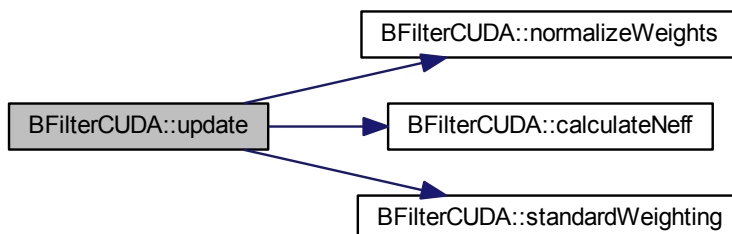


### 3.2.2.14 void BFilterCUDA::update ( fvec *measurement* ) [virtual]

processing update step including resampling if possible

Reimplemented in [BFilterSIRCUDA](#).

Here is the call graph for this function:



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

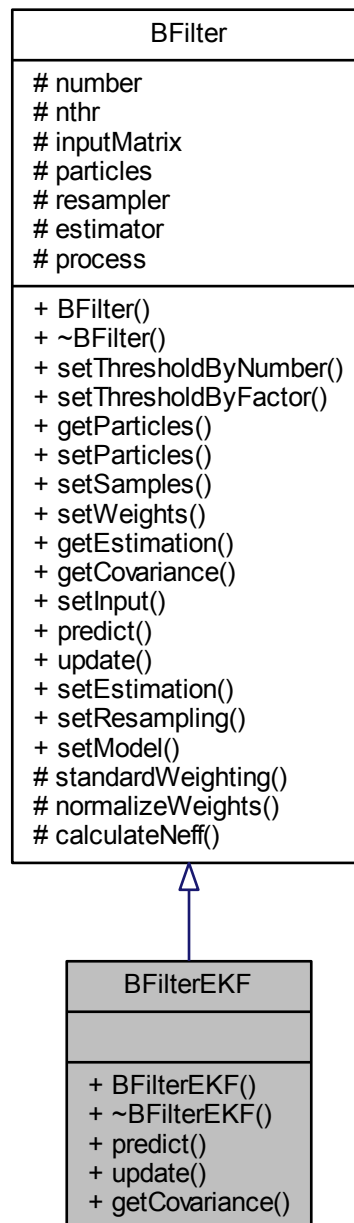


- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_cuda.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_cuda.cpp

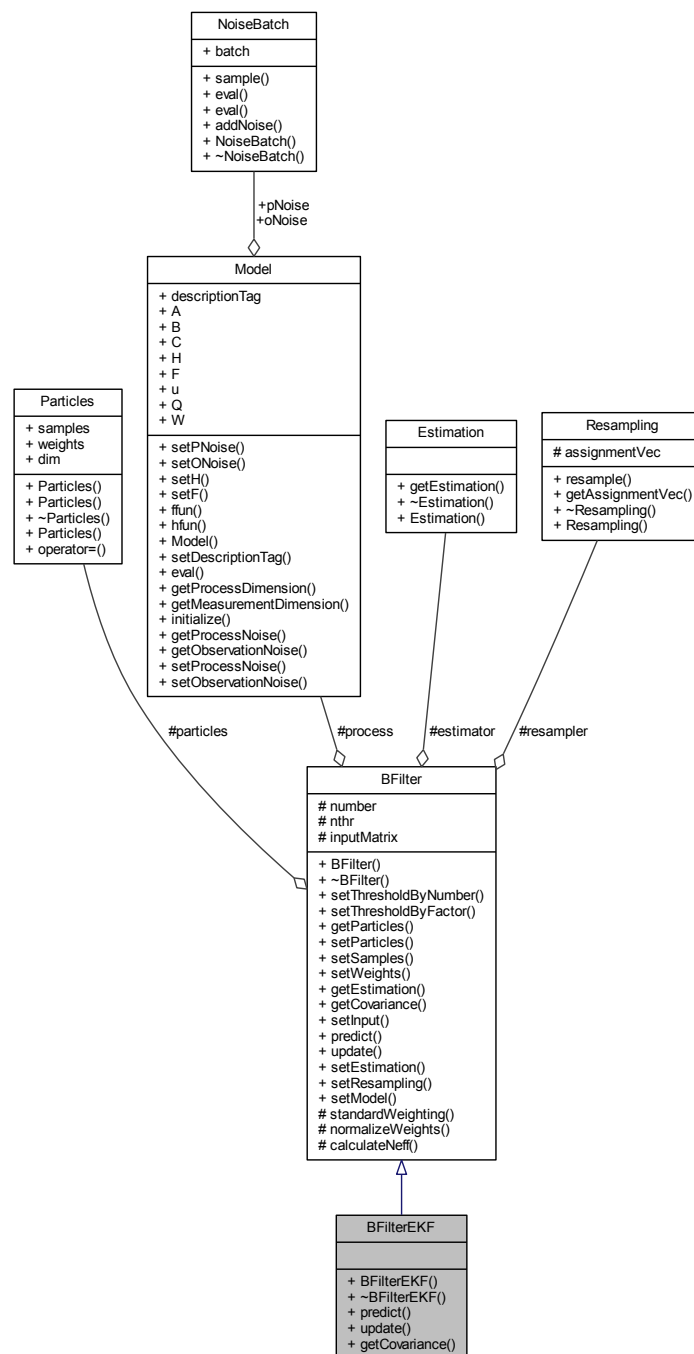
### 3.3 BFilterEKF Class Reference

```
#include <bf_ekf.h>
```

Inheritance diagram for BFilterEKF:



Collaboration diagram for BFilterEKF:



## Public Member Functions

- void [predict](#) ()
- void [update](#) (fvec)
- fmat [getCovariance](#) ()

## Additional Inherited Members

### 3.3.1 Detailed Description

Extended Kalman Filter

### 3.3.2 Member Function Documentation

**3.3.2.1** void BFilterEKF::predict ( ) [virtual]

pressing prediction step including a temporary estimation

Reimplemented from [BFilter](#).

**3.3.2.2** void BFilterEKF::update ( *fvec measurement* ) [virtual]

processing update step including resampling if possible

Reimplemented from [BFilter](#).

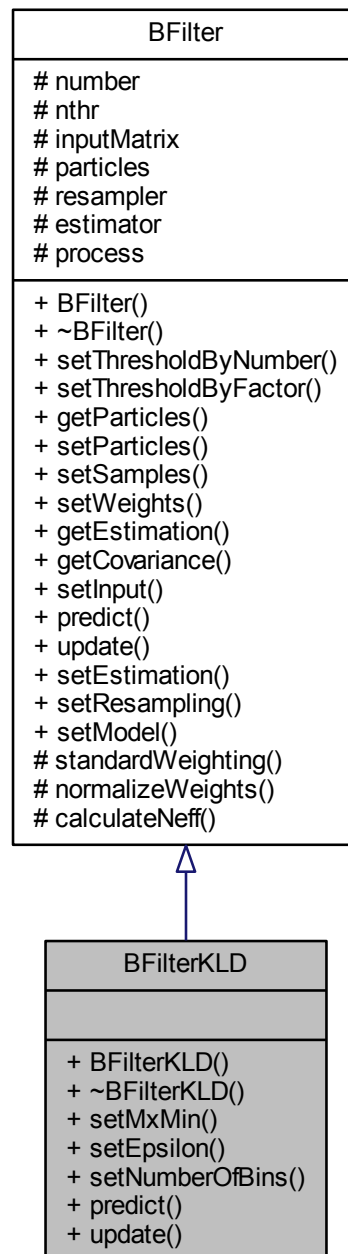
The documentation for this class was generated from the following files:

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_ekf.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_ekf.cpp

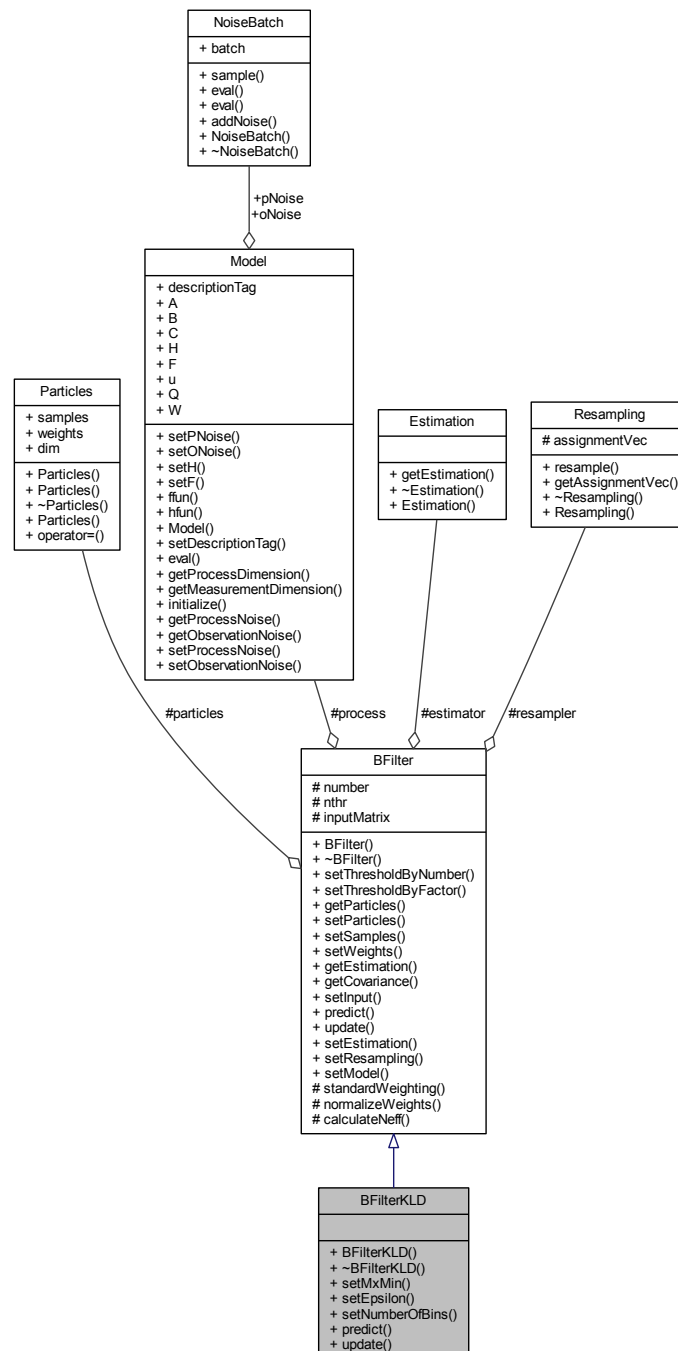
## 3.4 BFilterKLD Class Reference

```
#include <bf_kld.h>
```

Inheritance diagram for BFilterKLD:



Collaboration diagram for BFilterKLD:



## Public Member Functions

- void **setMxMin** (unsigned int MxMin)
- void **setEpsilon** (float epsilon)
- void **setNumberOfBins** (unsigned int number)
- void **predict** ()
- void **update** (fvec)

## Additional Inherited Members

### 3.4.1 Detailed Description

particle filter using Kullback-Leibler Divergence sampling

### 3.4.2 Member Function Documentation

#### 3.4.2.1 void BFilterKLD::predict ( ) [virtual]

pressing prediction step including a temporary estimation

Reimplemented from [BFilter](#).

#### 3.4.2.2 void BFilterKLD::update ( fvec *measurement* ) [virtual]

processing update step including resampling if possible

Reimplemented from [BFilter](#).

Here is the call graph for this function:



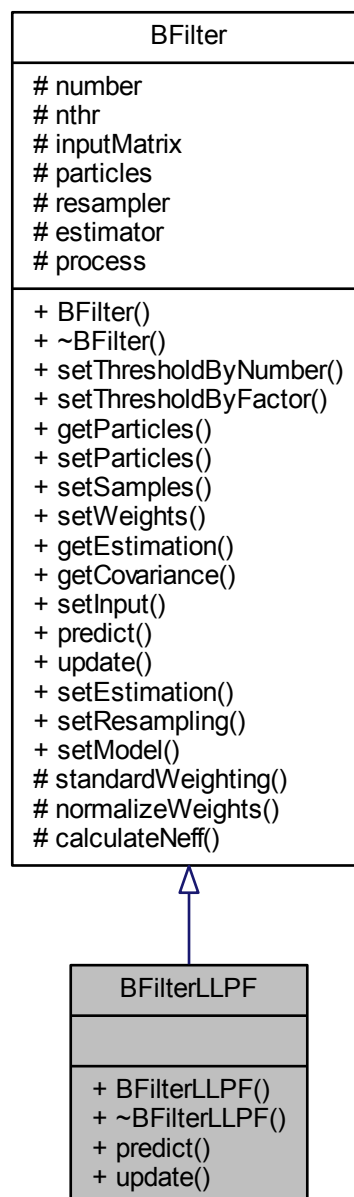
The documentation for this class was generated from the following files:

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_kld.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_kld.cpp

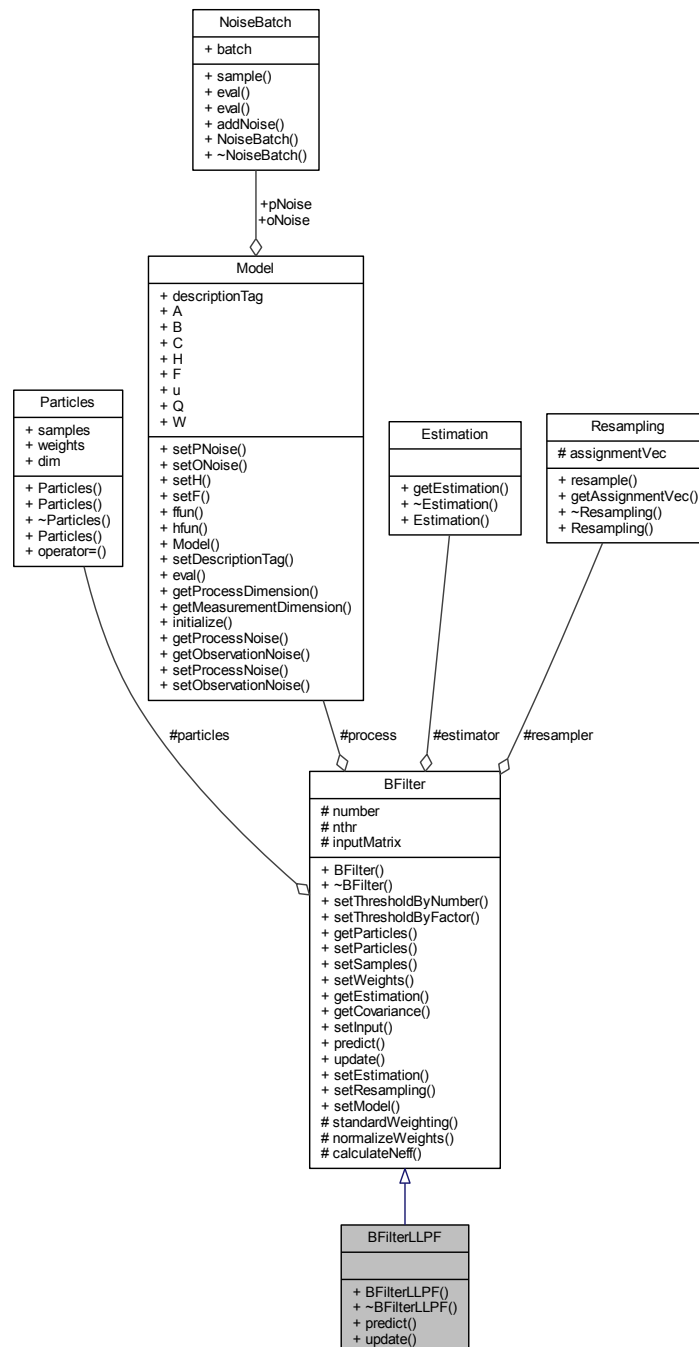
## 3.5 BFilterLLPF Class Reference

```
#include <bf_llpf.h>
```

Inheritance diagram for BFilterLLPF:



Collaboration diagram for BFilterLLPF:



## Public Member Functions

- void `predict` ()
- void `update` (fvec)

## Additional Inherited Members



### 3.5.1 Detailed Description

Local Linearization [Particle](#) Filter

### 3.5.2 Member Function Documentation

#### 3.5.2.1 void BFilterLLPF::predict ( ) [virtual]

pressing prediction step including a temporary estimation

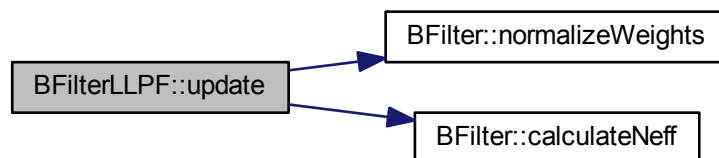
Reimplemented from [BFilter](#).

#### 3.5.2.2 void BFilterLLPF::update ( fvec *measurement* ) [virtual]

processing update step including resampling if possible

Reimplemented from [BFilter](#).

Here is the call graph for this function:



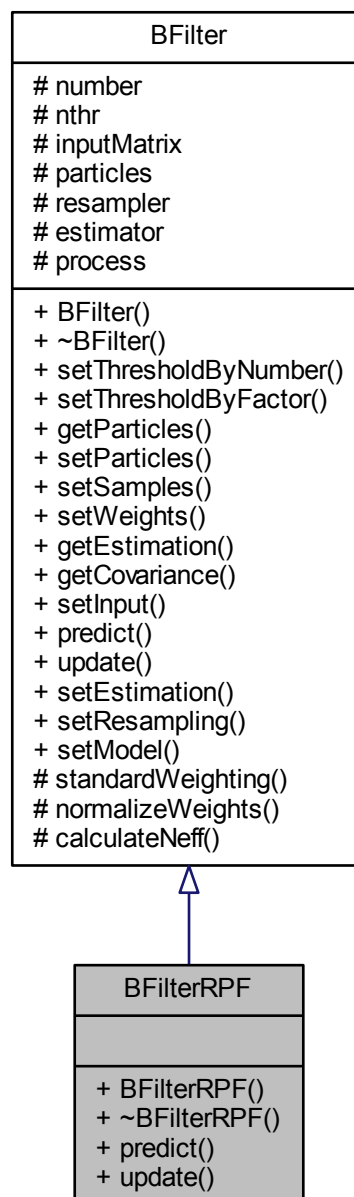
The documentation for this class was generated from the following files:

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_llpf.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_llpf.cpp

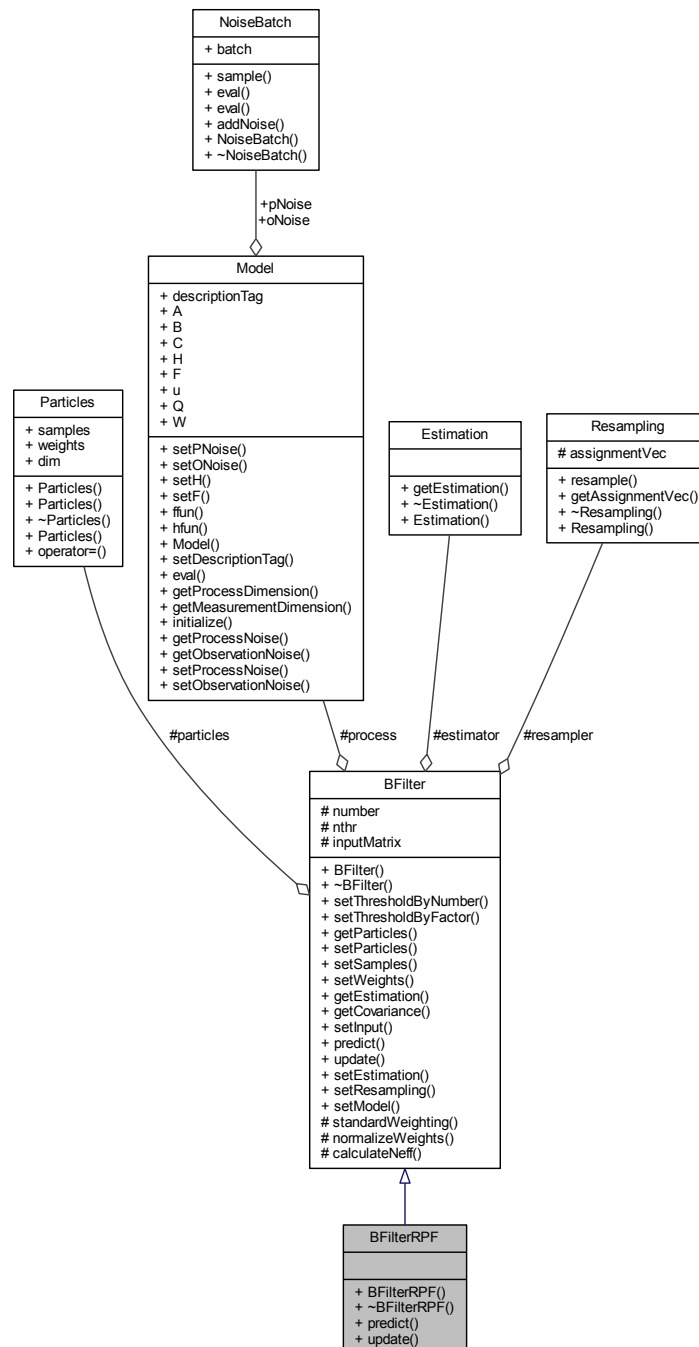
## 3.6 BFilterRPF Class Reference

```
#include <bf_rpf.h>
```

Inheritance diagram for BFilterRPF:



Collaboration diagram for BFilterRPF:



## Public Member Functions

- void [predict](#) ()
- void [update](#) (fvec)

## Additional Inherited Members

### 3.6.1 Detailed Description

Regularized [Particle](#) Filter

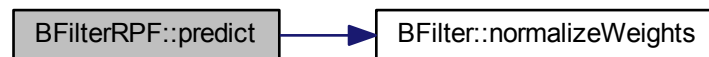
### 3.6.2 Member Function Documentation

#### 3.6.2.1 `void BFilterRPF::predict ( )` [virtual]

pressing prediction step including a temporary estimation

Reimplemented from [BFilter](#).

Here is the call graph for this function:

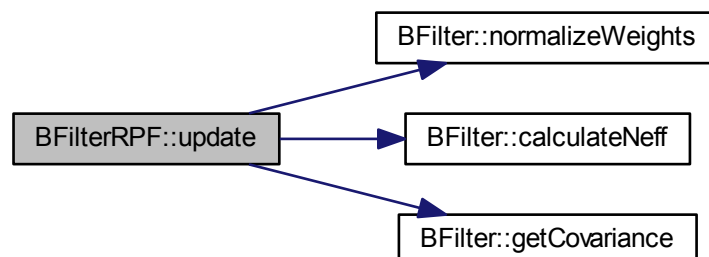


#### 3.6.2.2 `void BFilterRPF::update ( fvec measurement )` [virtual]

processing update step including resampling if possible

Reimplemented from [BFilter](#).

Here is the call graph for this function:



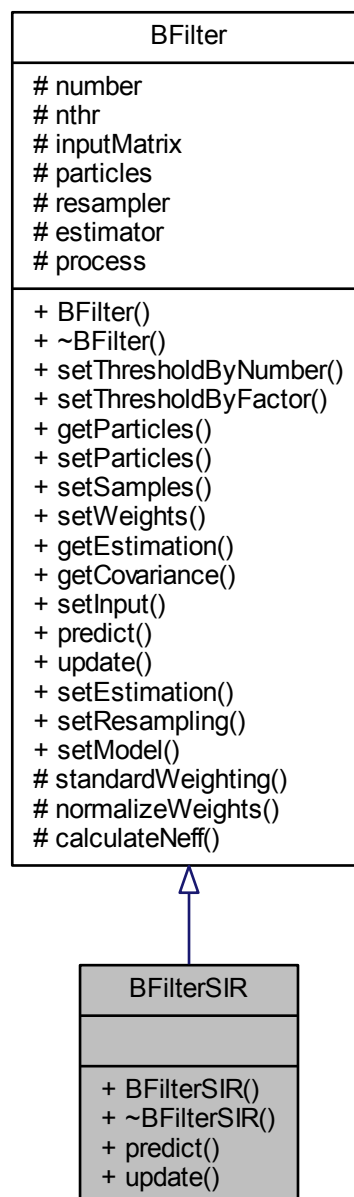
The documentation for this class was generated from the following files:

- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf_rpf.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf_rpf.cpp`

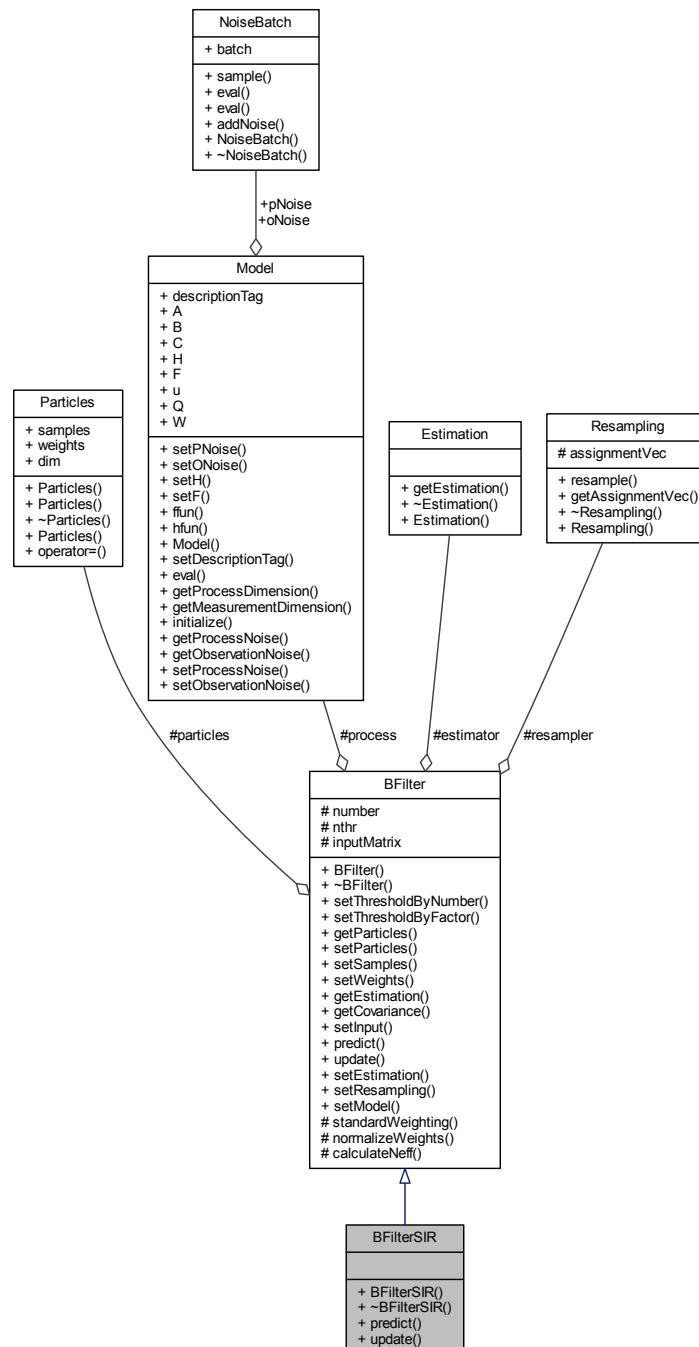
## 3.7 BFilterSIR Class Reference

```
#include <bf_sirpf.h>
```

Inheritance diagram for BFilterSIR:



Collaboration diagram for BFilterSIR:



## Public Member Functions

- void [predict](#) ()
- void [update](#) (fvec)

## Additional Inherited Members

### 3.7.1 Detailed Description

Sequential Importance [Resampling Particle](#) Filter

### 3.7.2 Member Function Documentation

#### 3.7.2.1 void BFilterSIR::predict ( ) [virtual]

pressing prediction step including a temporary estimation

Reimplemented from [BFilter](#).

Here is the call graph for this function:

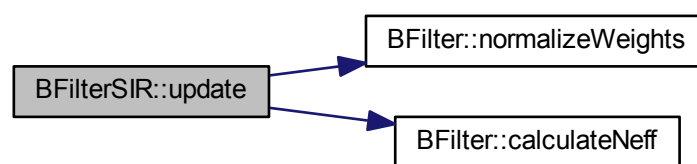


#### 3.7.2.2 void BFilterSIR::update ( fvec *measurement* ) [virtual]

processing update step including resampling if possible

Reimplemented from [BFilter](#).

Here is the call graph for this function:



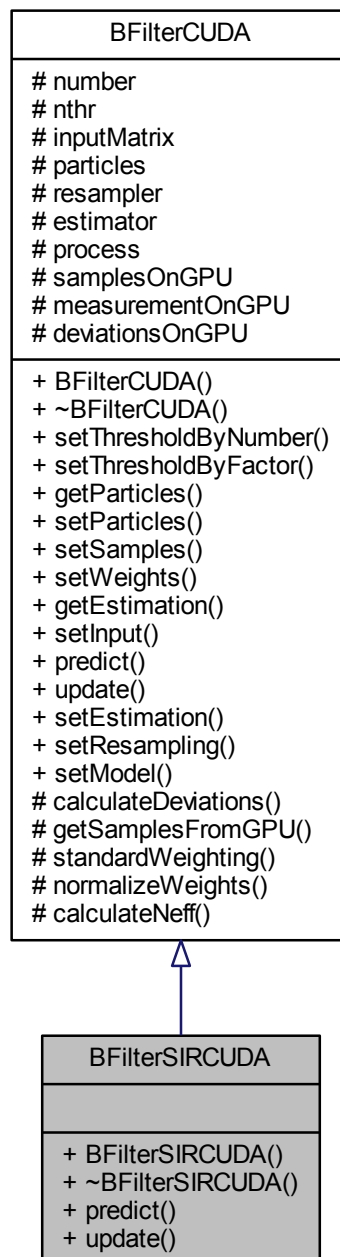
The documentation for this class was generated from the following files:

- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf_sirpf.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf_sirpf.cpp`

## 3.8 BFilterSIRCUDA Class Reference

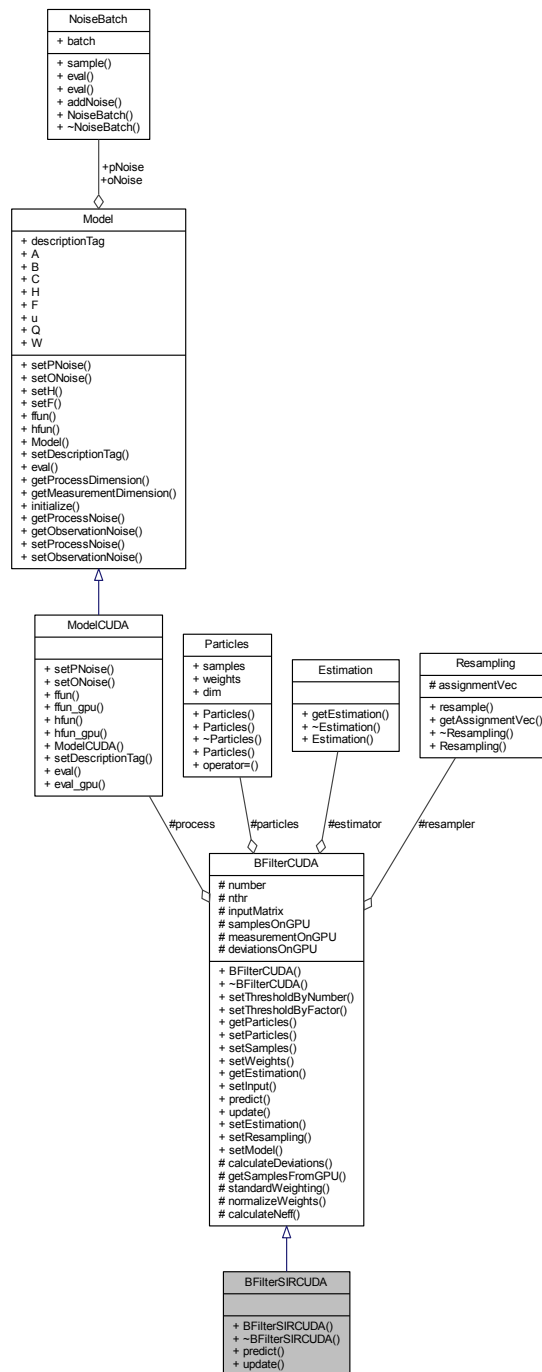
```
#include <bf_sirpf_cuda.h>
```

Inheritance diagram for BFilterSIRCUDA:





Collaboration diagram for BFilterSIRCUDA:



## Public Member Functions

- void [predict](#) ()
- void [update](#) (fvec)

## Additional Inherited Members

### 3.8.1 Detailed Description

GPU accelerated Sequential Importance [Resampling Particle](#) Filter

### 3.8.2 Member Function Documentation

#### 3.8.2.1 void BFilterSIRCUDA::predict ( ) [virtual]

pressing prediction step including a temporary estimation

Reimplemented from [BFilterCUDA](#).

Here is the call graph for this function:

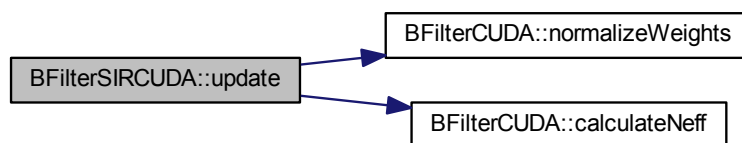


#### 3.8.2.2 void BFilterSIRCUDA::update ( fvec measurement ) [virtual]

processing update step including resampling if possible

Reimplemented from [BFilterCUDA](#).

Here is the call graph for this function:



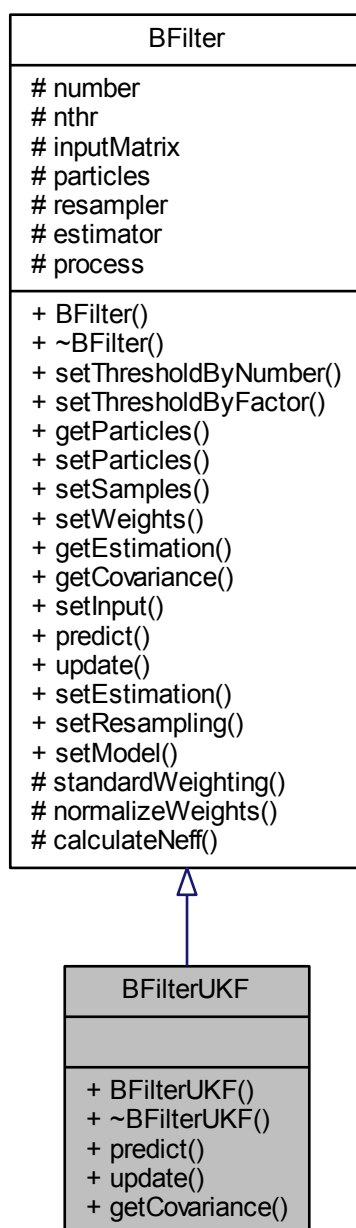
The documentation for this class was generated from the following files:

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_sirpf\_cuda.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_sirpf\_cuda.cpp

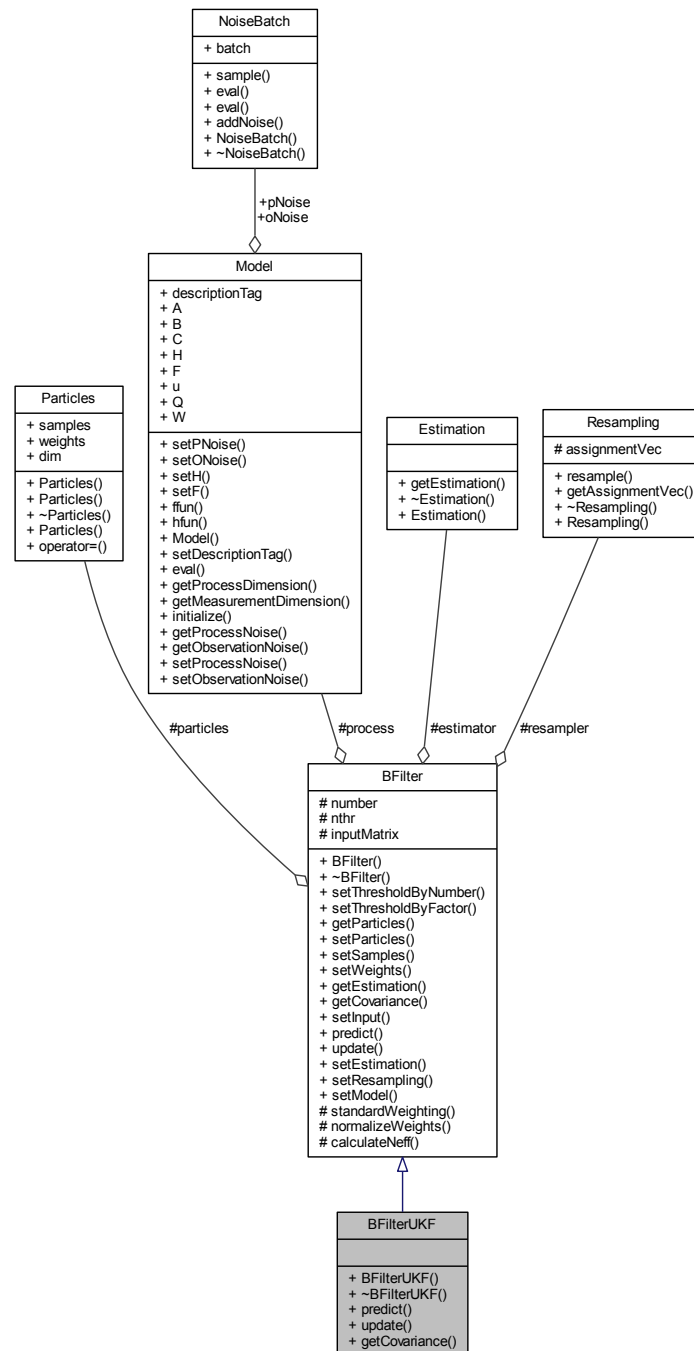
## 3.9 BFilterUKF Class Reference

```
#include <bf_ukf.h>
```

Inheritance diagram for BFilterUKF:



Collaboration diagram for BFilterUKF:



## Public Member Functions

- void [predict](#) ()
- void [update](#) (fvec)
- fmat [getCovariance](#) ()



## Public Member Functions

- virtual fmat **getEstimation** ([Particles](#) \*)

### 3.10.1 Detailed Description

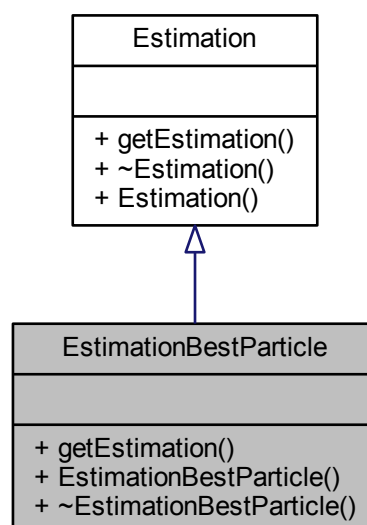
base class for estimation methods

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

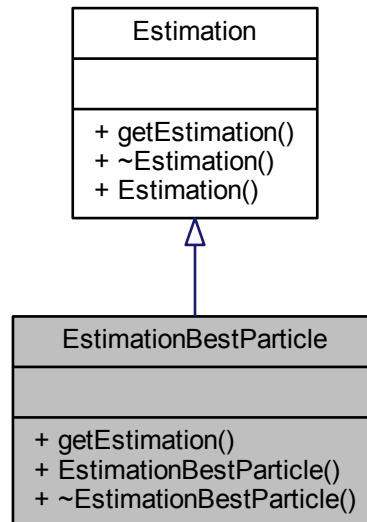
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation.cpp

## 3.11 EstimationBestParticle Class Reference

Inheritance diagram for EstimationBestParticle:



Collaboration diagram for EstimationBestParticle:



## Public Member Functions

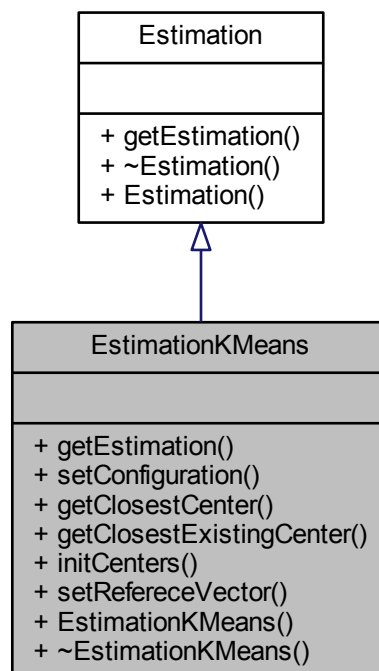
- fmat **getEstimation** ([Particles](#) \*)

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

- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation_best_particle.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation_best_particle.cpp`

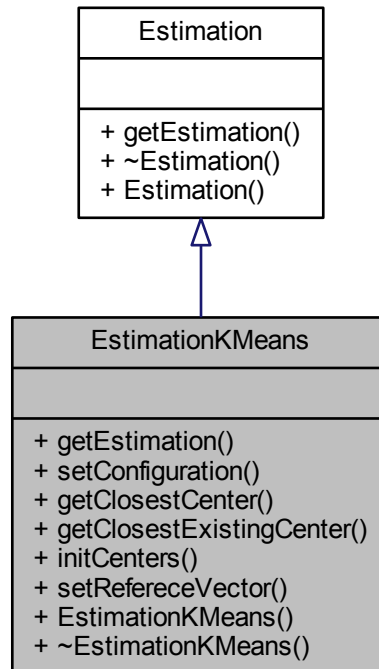
### 3.12 EstimationKMeans Class Reference

Inheritance diagram for EstimationKMeans:





Collaboration diagram for EstimationKMeans:



## Public Member Functions

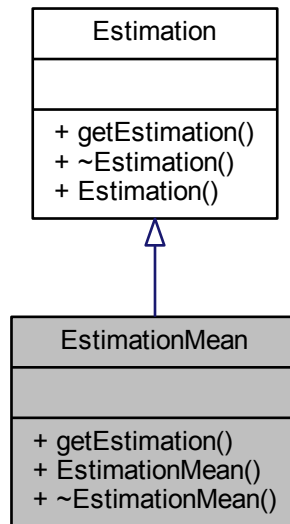
- fmat **getEstimation** ([Particles](#) \*)
- void **setConfiguration** (unsigned int, unsigned int)
- unsigned int **getClosestCenter** (unsigned int)
- unsigned int **getClosestExistingCenter** ()
- void **initCenters** ()
- void **setRefereceVector** (fvec)

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

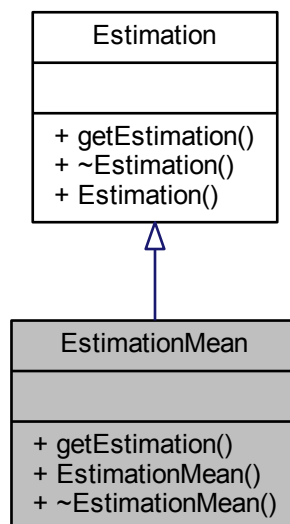
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_kmeans.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_kmeans.cpp

### 3.13 EstimationMean Class Reference

Inheritance diagram for EstimationMean:



Collaboration diagram for EstimationMean:



## Public Member Functions

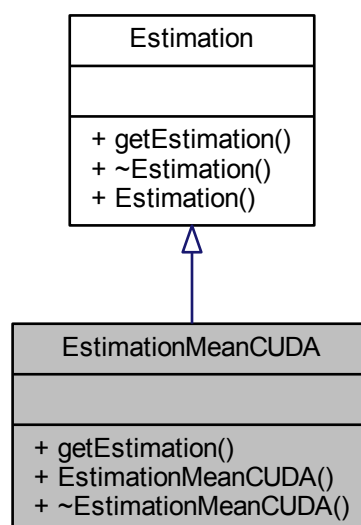
- fmat **getEstimation** ([Particles](#) \*)

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

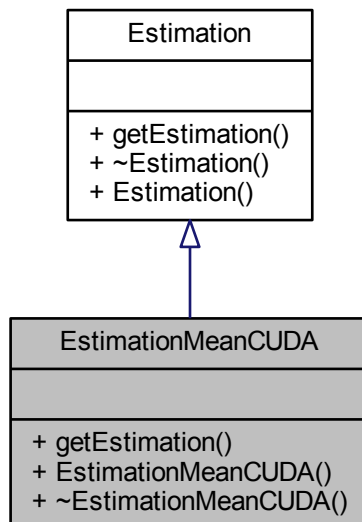
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_mean.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_mean.cpp

## 3.14 EstimationMeanCUDA Class Reference

Inheritance diagram for EstimationMeanCUDA:



Collaboration diagram for EstimationMeanCUDA:



## Public Member Functions

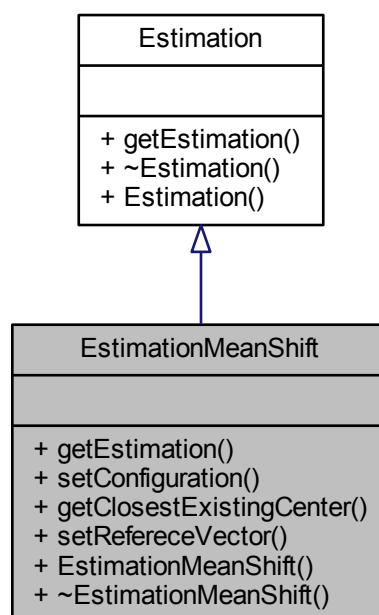
- fmat **getEstimation** ([Particles](#) \*)

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

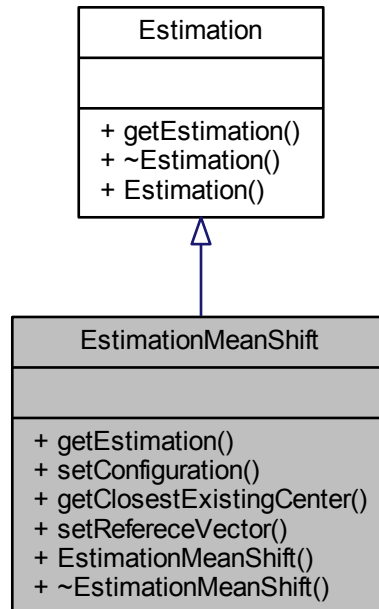
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_mean\_cuda.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_mean\_cuda.cpp

## 3.15 EstimationMeanShift Class Reference

Inheritance diagram for EstimationMeanShift:



Collaboration diagram for EstimationMeanShift:



## Public Member Functions

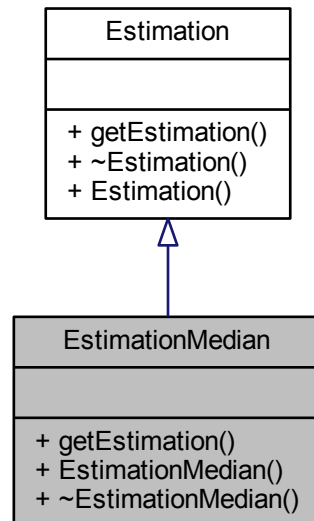
- `format` **getEstimation** ([Particles](#) \*)
- `void` **setConfiguration** (float distance, float epsilon, unsigned int maxIterations)
- `unsigned int` **getClosestExistingCenter** ()
- `void` **setRefereceVector** (fvec)

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

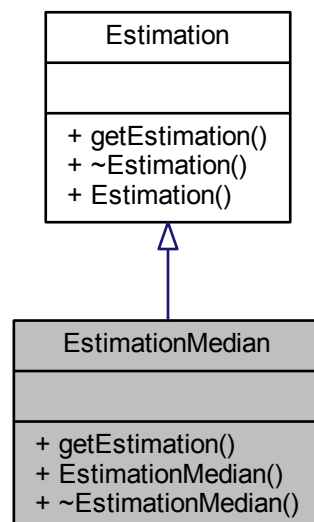
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation_mean_shift.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation_mean_shift.cpp`

## 3.16 EstimationMedian Class Reference

Inheritance diagram for EstimationMedian:



Collaboration diagram for EstimationMedian:



## Public Member Functions

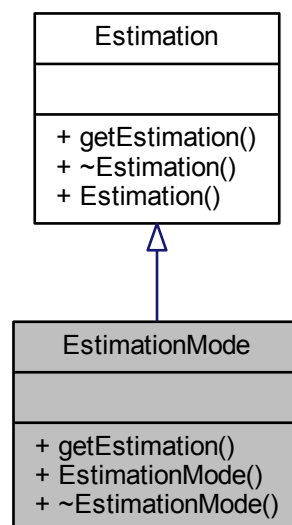
- fmat **getEstimation** ([Particles](#) \*)

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

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_median.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_median.cpp

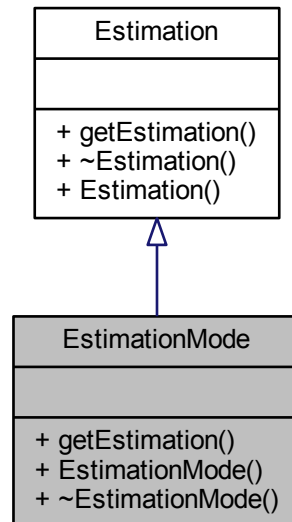
## 3.17 EstimationMode Class Reference

Inheritance diagram for EstimationMode:





Collaboration diagram for EstimationMode:



## Public Member Functions

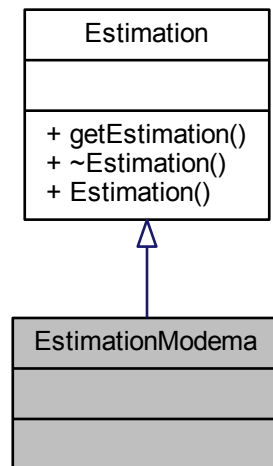
- fmat **getEstimation** ([Particles](#) \*)

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

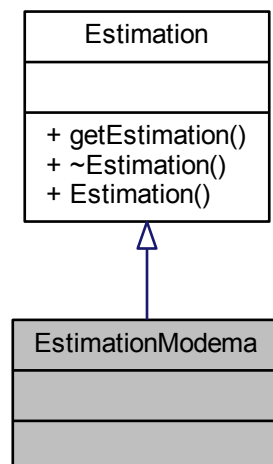
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation_mode.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation_mode.cpp`

### 3.18 EstimationModema Class Reference

Inheritance diagram for EstimationModema:



Collaboration diagram for EstimationModema:



#### Additional Inherited Members

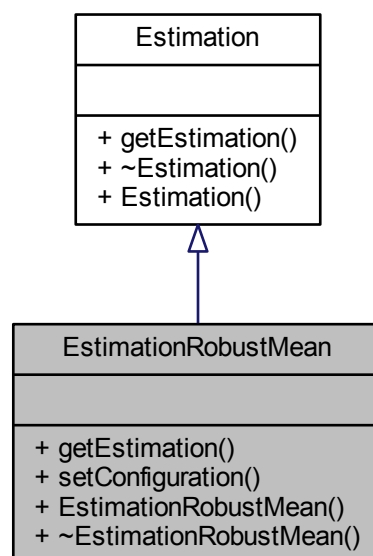
The documentation for this class was generated from the following file:

- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation_modema.h`

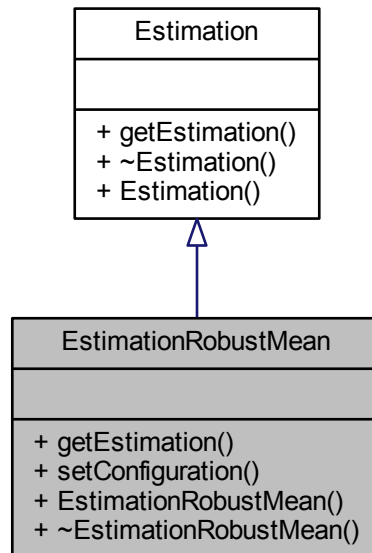
## 3.19 EstimationRobustMean Class Reference

```
#include <estimation_robust_mean.h>
```

Inheritance diagram for EstimationRobustMean:



Collaboration diagram for EstimationRobustMean:



## Public Member Functions

- fmat **getEstimation** ([Particles](#) \*)
- void **setConfiguration** (fvec)

### 3.19.1 Detailed Description

robust mean estimation

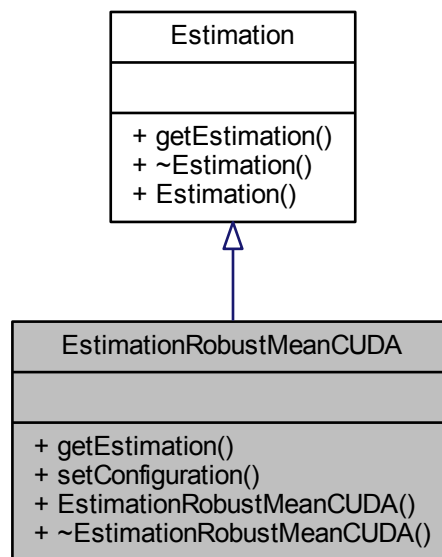
The documentation for this class was generated from the following files:

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_robust\_mean.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_robust\_mean.cpp

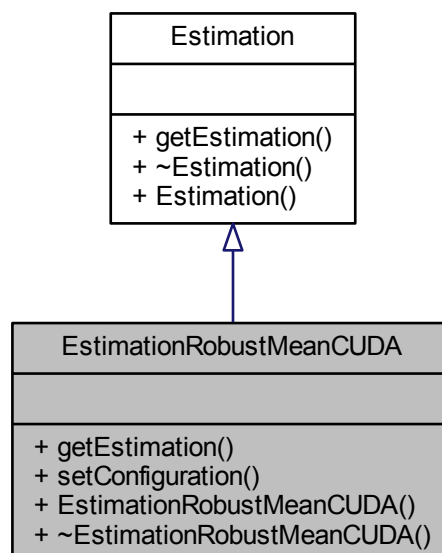
## 3.20 EstimationRobustMeanCUDA Class Reference

```
#include <estimation_robust_mean_cuda.h>
```

Inheritance diagram for EstimationRobustMeanCUDA:



Collaboration diagram for EstimationRobustMeanCUDA:



## Public Member Functions

- fmat **getEstimation** ([Particles](#) \*)
- void **setConfiguration** (fvec)

### 3.20.1 Detailed Description

GPU accelerated robust mean estimation

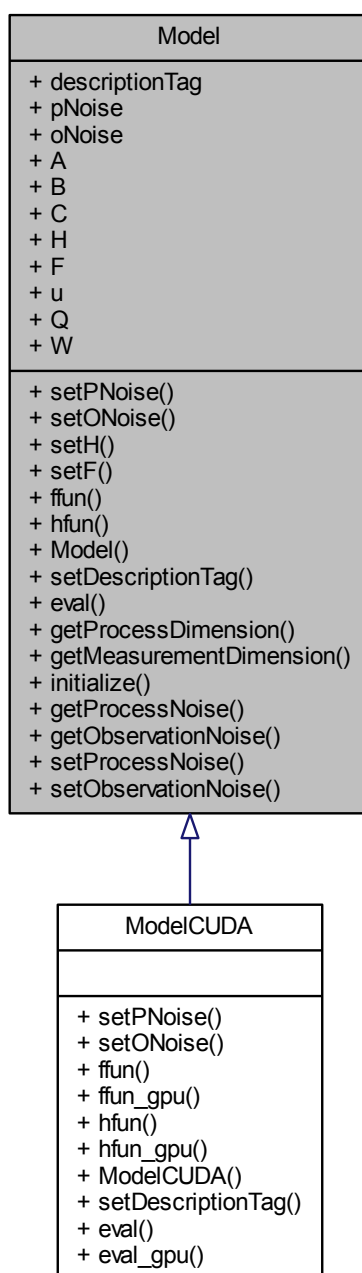
The documentation for this class was generated from the following files:

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_robust\_mean\_cuda.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/estimation\_robust\_mean\_cuda.cpp

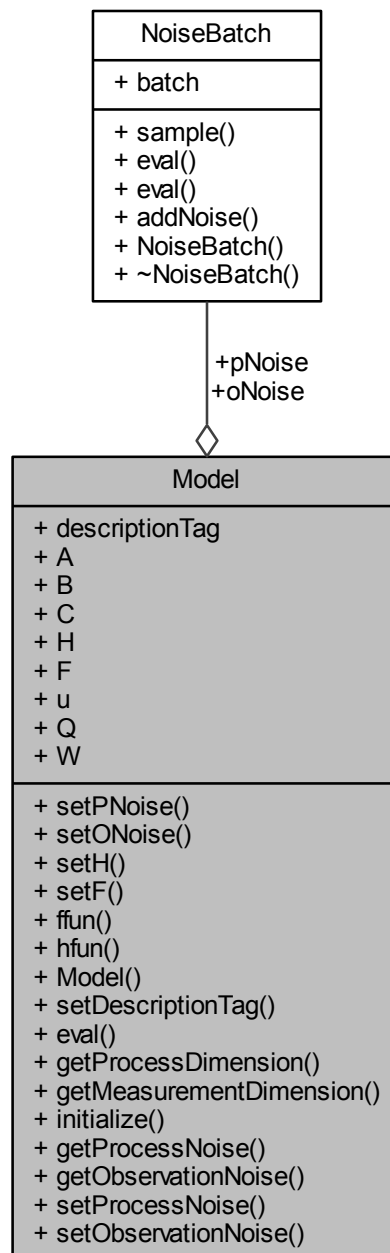
### 3.21 Model Class Reference

```
#include <model.h>
```

Inheritance diagram for Model:



Collaboration diagram for Model:



## Public Member Functions

- virtual void **setPNoise** ()
- virtual void **setONoise** ()
- virtual void **setH** ()
- virtual void **setF** ()
- virtual fmat **ffun** (fmat \*)



- virtual fmat **hfun** (fmat \*)
- virtual void **setDescriptionTag** ()
- virtual frowvec **eval** (fmat \*values)
- unsigned int **getProcessDimension** ()
- unsigned int **getMeasurementDimension** ()
- void **initialize** ()
- [NoiseBatch](#) **getProcessNoise** ()
- [NoiseBatch](#) **getObservationNoise** ()
- void **setProcessNoise** ([NoiseBatch](#) newPNoise)
- void **setObservationNoise** ([NoiseBatch](#) newONoise)

### Public Attributes

- std::string **descriptionTag**
- [NoiseBatch](#) **pNoise**
- [NoiseBatch](#) **oNoise**
- fmat **A**
- fmat **B**
- fmat **C**
- fmat **H**
- fmat **F**
- fvec **u**
- fmat **Q**
- fmat **W**

#### 3.21.1 Detailed Description

state space model base class

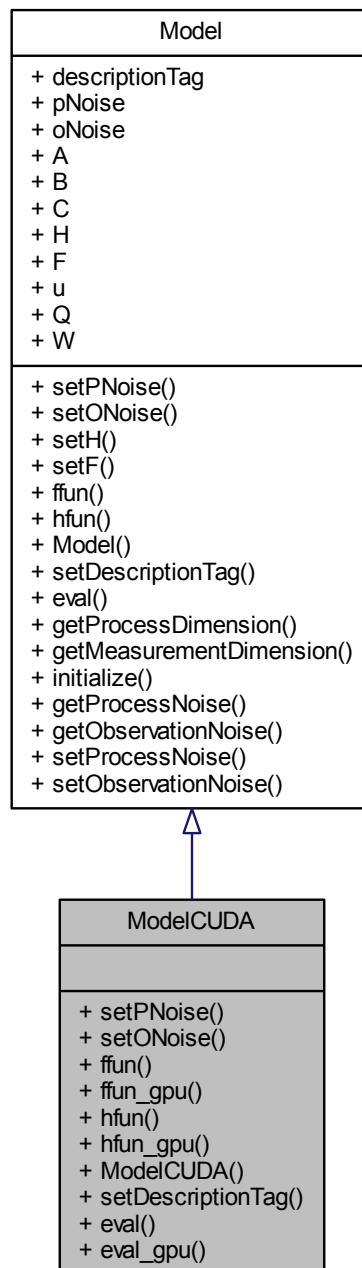
The documentation for this class was generated from the following files:

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/model.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/model.cpp

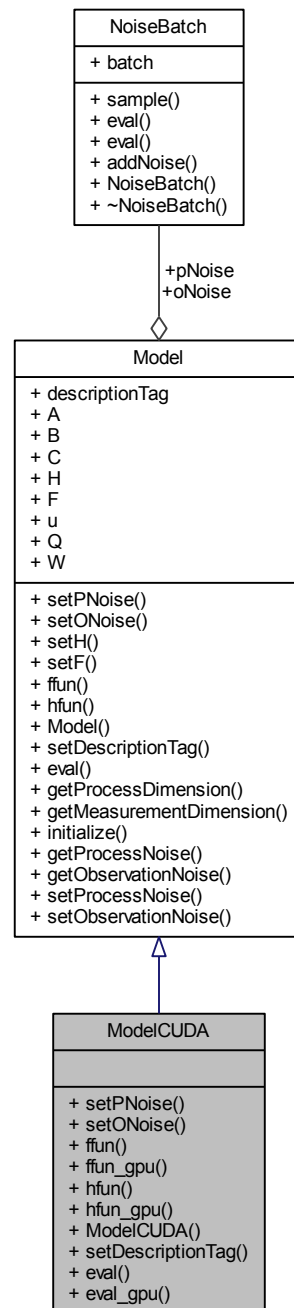
## 3.22 ModelCUDA Class Reference

```
#include <model_cuda.h>
```

Inheritance diagram for ModelCUDA:



Collaboration diagram for ModelCUDA:



## Public Member Functions

- virtual void **setPNoise** ()
- virtual void **setONoise** ()
- virtual fmat **ffun** (fmat \*)
- virtual float \* **ffun\_gpu** (fmat \*current)
- virtual fmat **hfun** (fmat \*)

- virtual float \* **hfun\_gpu** (float \*values, int numberOfParticles, int stateDimension)
- virtual void **setDescriptionTag** ()
- virtual frowvec **eval** (fmat \*values)
- virtual frowvec **eval\_gpu** (float \*values, int numberOfParticles)

## Additional Inherited Members

### 3.22.1 Detailed Description

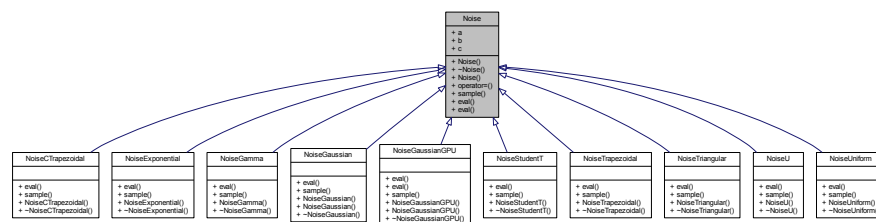
base class for a GPU accelerated state space model

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

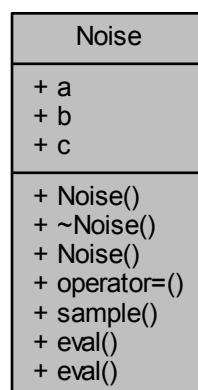
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/model\_cuda.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/model\_cuda.cpp

## 3.23 Noise Class Reference

Inheritance diagram for Noise:



Collaboration diagram for Noise:



### Public Member Functions

- **Noise** (const [Noise](#) &)
- [Noise](#) & **operator=** (const [Noise](#) &)
- virtual frowvec **sample** (unsigned int)
- virtual frowvec **eval** (frowvec)
- virtual frowvec **eval** (float \*input, int number, int dim, int numberOfDims)

### Public Attributes

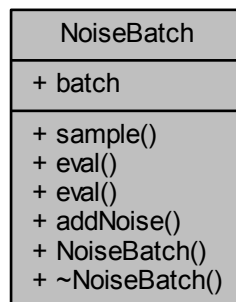
- float **a**
- float **b**
- float **c**

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

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noise.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noise.cpp

## 3.24 NoiseBatch Class Reference

Collaboration diagram for NoiseBatch:



### Public Member Functions

- fmat **sample** (unsigned int)
- frowvec **eval** (fmat \*)
- frowvec **eval** (float \*x, unsigned int number)
- void **addNoise** ([Noise](#) \*)

### Public Attributes

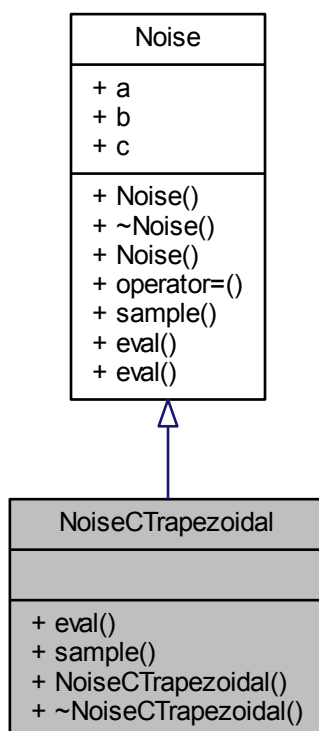
- std::vector< [Noise](#) \* > **batch**

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

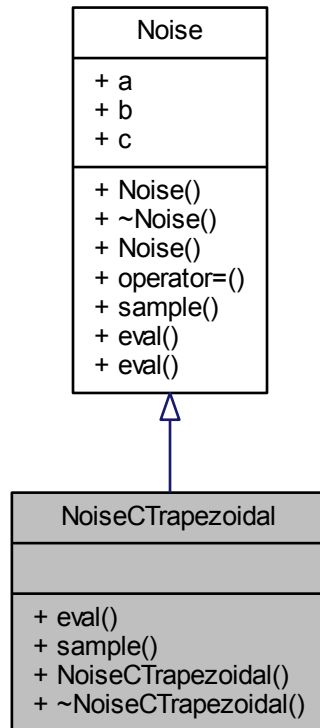
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noise_batch.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noise_batch.cpp`

### 3.25 NoiseCTrapezoidal Class Reference

Inheritance diagram for NoiseCTrapezoidal:



Collaboration diagram for NoiseCTrapezoidal:



## Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **sample** (unsigned int)
- **NoiseCTrapezoidal** (float, float, float, float)

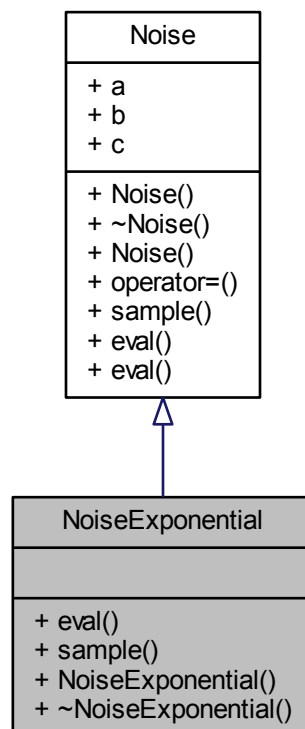
## Additional Inherited Members

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

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_ctrap.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_ctrap.cpp

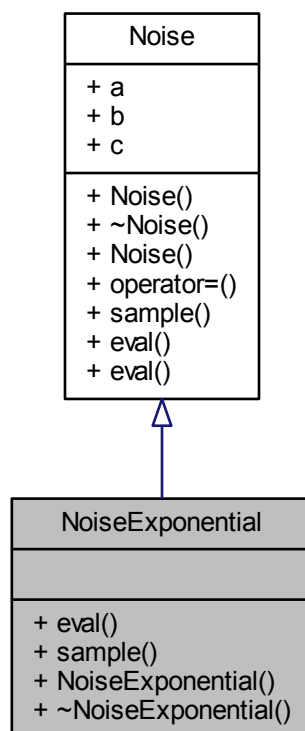
### 3.26 NoiseExponential Class Reference

Inheritance diagram for NoiseExponential:





Collaboration diagram for NoiseExponential:



## Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **sample** (unsigned int)
- **NoiseExponential** (float)

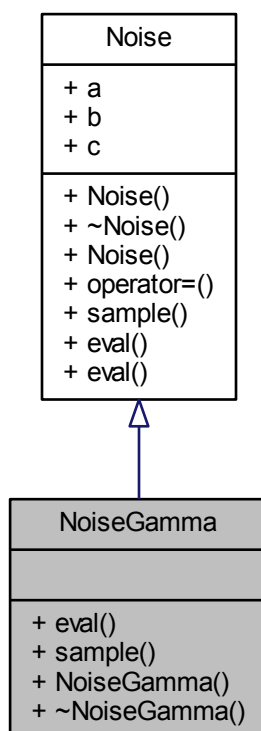
## Additional Inherited Members

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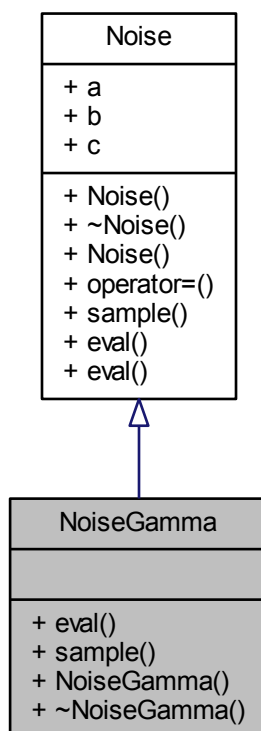
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_exp.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_exp.cpp

### 3.27 NoiseGamma Class Reference

Inheritance diagram for NoiseGamma:



Collaboration diagram for NoiseGamma:



## Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **sample** (unsigned int)
- **NoiseGamma** (unsigned int)

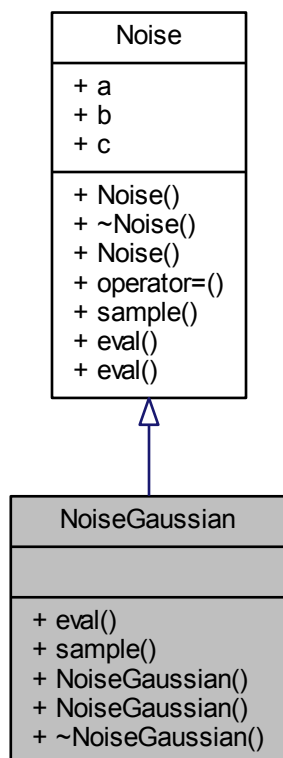
## Additional Inherited Members

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

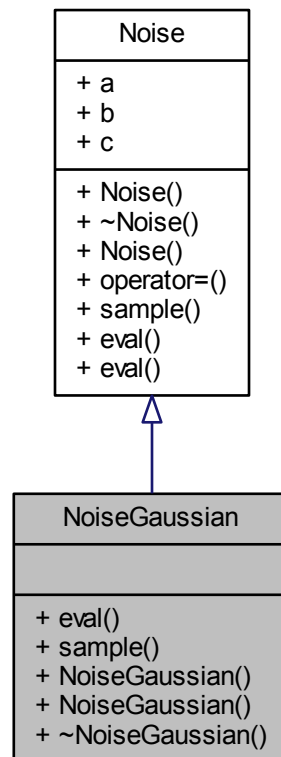
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_gamma.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_gamma.cpp

### 3.28 NoiseGaussian Class Reference

Inheritance diagram for NoiseGaussian:



Collaboration diagram for NoiseGaussian:



## Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **sample** (unsigned int)
- **NoiseGaussian** (float, float)
- **NoiseGaussian** (const [NoiseGaussian](#) &)

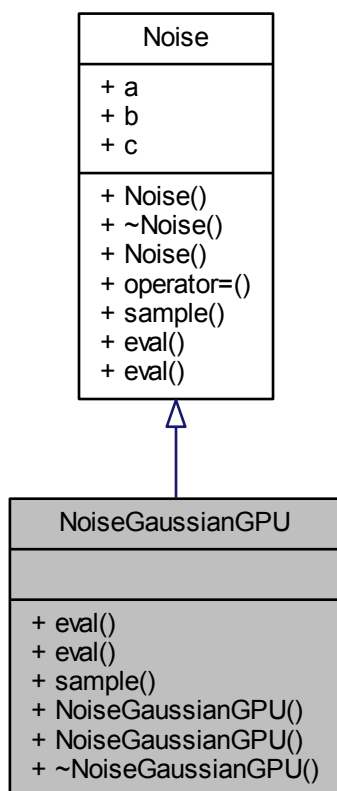
## Additional Inherited Members

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

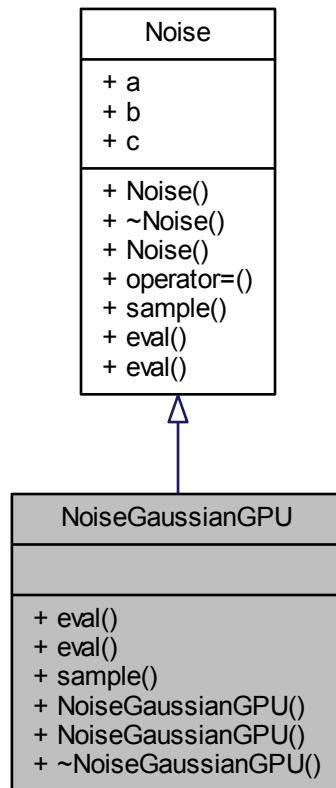
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise_gauss.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise_gauss.cpp`

### 3.29 NoiseGaussianGPU Class Reference

Inheritance diagram for NoiseGaussianGPU:



Collaboration diagram for NoiseGaussianGPU:



## Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **eval** (float \*input, int number, int dim, int numberOfDims)
- frowvec **sample** (unsigned int)
- **NoiseGaussianGPU** (float, float)
- **NoiseGaussianGPU** (const [NoiseGaussianGPU](#) &)

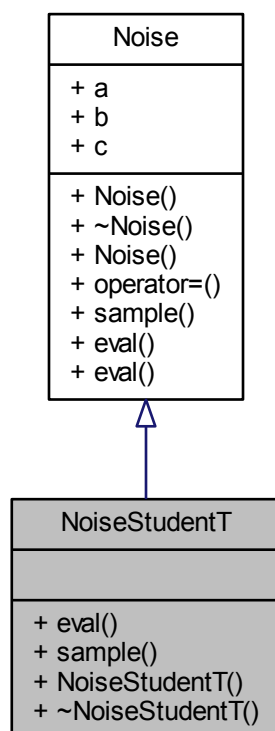
## Additional Inherited Members

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

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_gauss\_gpu.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_gauss\_gpu.cpp

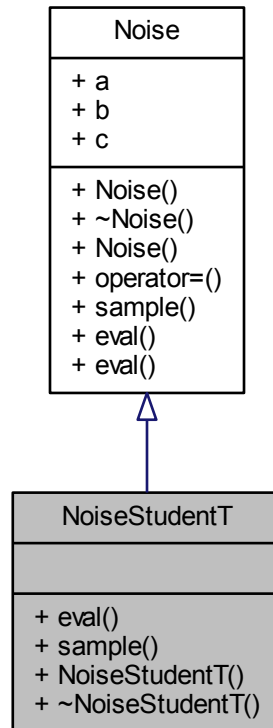
### 3.30 NoiseStudentT Class Reference

Inheritance diagram for NoiseStudentT:





Collaboration diagram for NoiseStudentT:



### Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **sample** (unsigned int)
- **NoiseStudentT** (float, float)

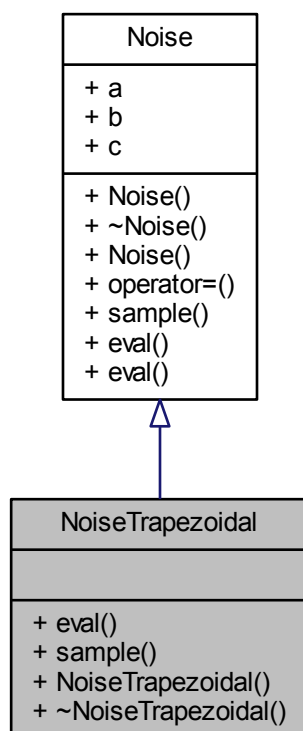
### Additional Inherited Members

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

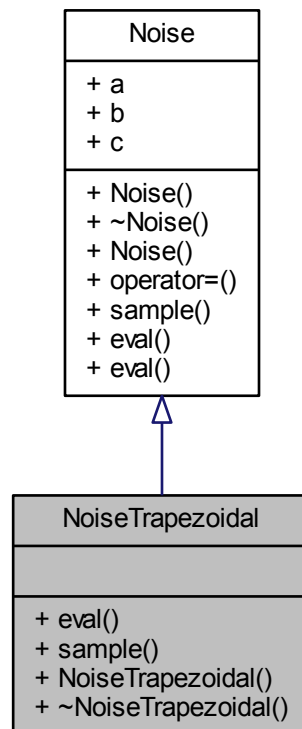
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_studentt.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_studentt.cpp

### 3.31 NoiseTrapezoidal Class Reference

Inheritance diagram for NoiseTrapezoidal:



Collaboration diagram for NoiseTrapezoidal:



## Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **sample** (unsigned int)
- **NoiseTrapezoidal** (float, float, float, float)

## Additional Inherited Members

### 3.31.1 Detailed Description

provides a noise with trapeziodal distribution

#### Warning

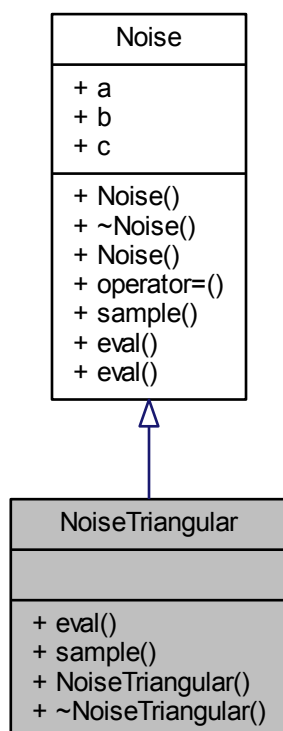
the evaluation doesn't work, because it needs four parameters and base class provides only three

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

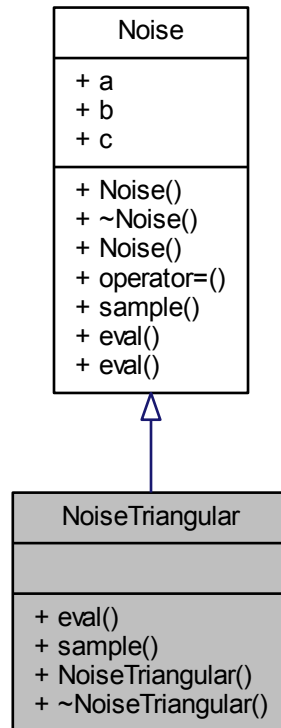
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise_trap.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise_trap.cpp`

### 3.32 NoiseTriangular Class Reference

Inheritance diagram for NoiseTriangular:



Collaboration diagram for NoiseTriangular:



### Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **sample** (unsigned int)
- **NoiseTriangular** (float, float)

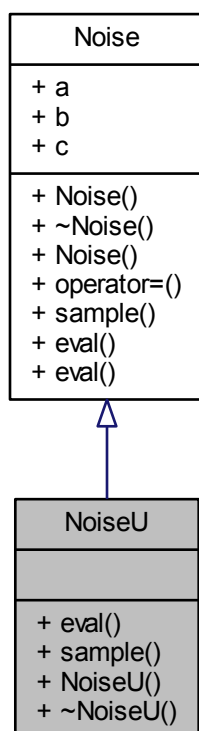
### Additional Inherited Members

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

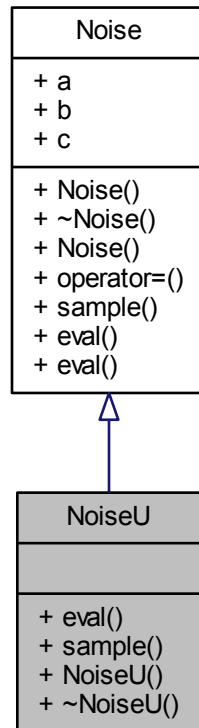
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_tri.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_tri.cpp

### 3.33 NoiseU Class Reference

Inheritance diagram for NoiseU:



Collaboration diagram for NoiseU:



### Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **sample** (unsigned int)
- **NoiseU** (float, float)

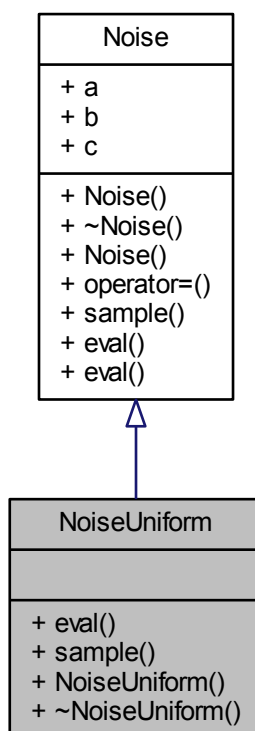
### Additional Inherited Members

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

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_u.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_u.cpp

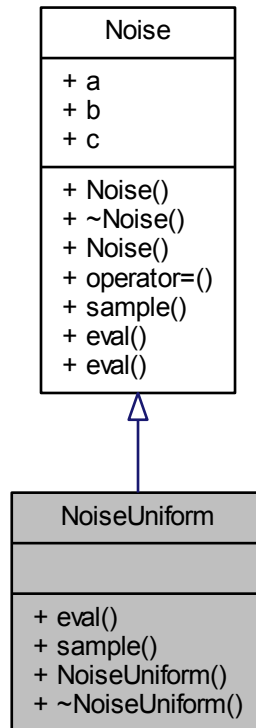
### 3.34 NoiseUniform Class Reference

Inheritance diagram for NoiseUniform:





Collaboration diagram for NoiseUniform:



## Public Member Functions

- frowvec **eval** (frowvec)
- frowvec **sample** (unsigned int)
- **NoiseUniform** (float, float)

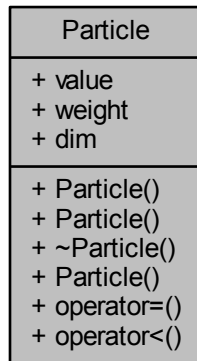
## Additional Inherited Members

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

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_uni.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/noises/noise\_uni.cpp

### 3.35 Particle Class Reference

Collaboration diagram for Particle:



#### Public Member Functions

- **Particle** (int)
- **Particle** (const [Particle](#) &)
- [Particle](#) & **operator=** (const [Particle](#) &)
- bool **operator<** (const [Particle](#) &) const

#### Public Attributes

- float \* **value**
- float **weight**
- int **dim**

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

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/particle.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/particle.cpp

## 3.36 Particles Class Reference

Collaboration diagram for Particles:

Particles
+ samples + weights + dim
+ Particles() + Particles() + ~Particles() + Particles() + operator=()

### Public Member Functions

- **Particles** (int)
- **Particles** (const [Particles](#) &)
- [Particles](#) & **operator=** (const [Particles](#) &)

### Public Attributes

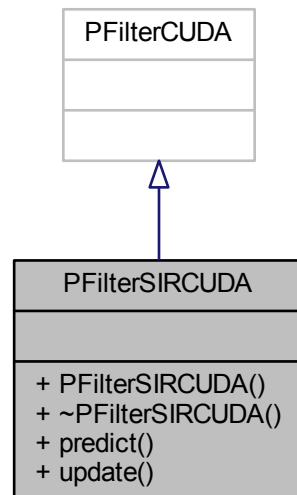
- fmat **samples**
- frowvec **weights**
- int **dim**

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

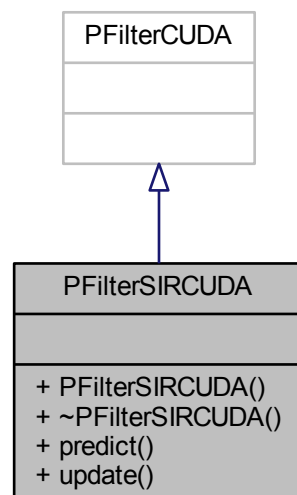
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/particles.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/particles.cpp

### 3.37 PFilterSIRCUDA Class Reference

Inheritance diagram for PFilterSIRCUDA:



Collaboration diagram for PFilterSIRCUDA:



#### Public Member Functions

- void **predict** ()

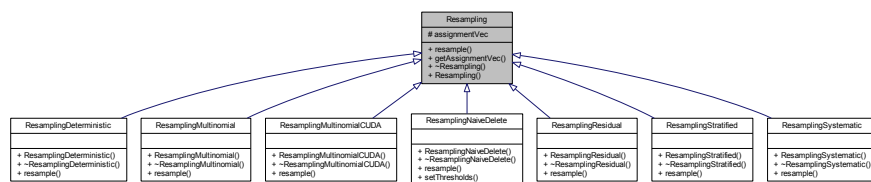
- void **update** (fvec)

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

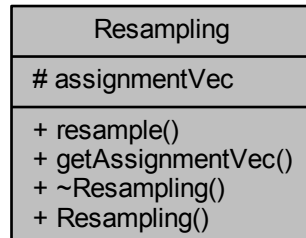
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_rpf\_cuda.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/bf\_rpf\_cuda.cpp

### 3.38 Resampling Class Reference

Inheritance diagram for Resampling:



Collaboration diagram for Resampling:



#### Public Member Functions

- virtual [Particles](#) **resample** ([Particles](#) \*)
- std::vector< int > **getAssignmentVec** ()

#### Protected Attributes

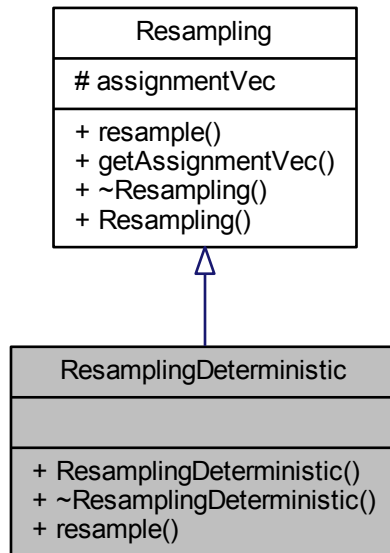
- std::vector< int > **assignmentVec**

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

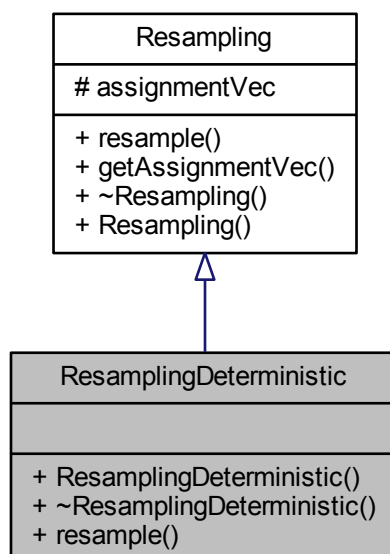
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling.cpp

### 3.39 ResamplingDeterministic Class Reference

Inheritance diagram for ResamplingDeterministic:



Collaboration diagram for ResamplingDeterministic:



## Public Member Functions

- [Particles](#) **resample** ([Particles](#) \*)

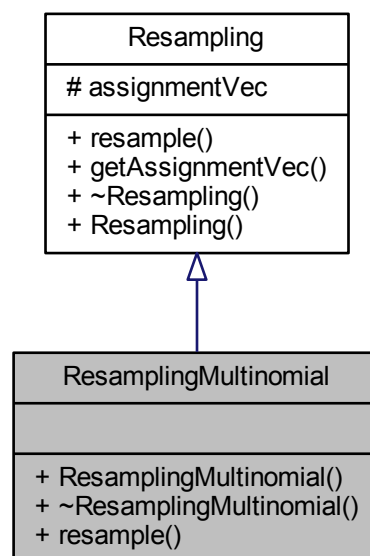
## Additional Inherited Members

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

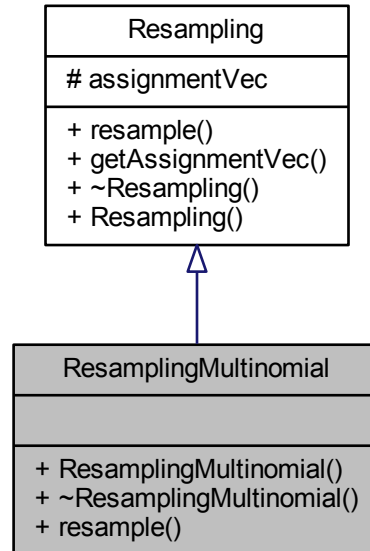
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_deterministic.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_deterministic.cpp

## 3.40 ResamplingMultinomial Class Reference

Inheritance diagram for ResamplingMultinomial:



Collaboration diagram for ResamplingMultinomial:



## Public Member Functions

- **Particles** **resample** (**Particles** \*)

## Additional Inherited Members

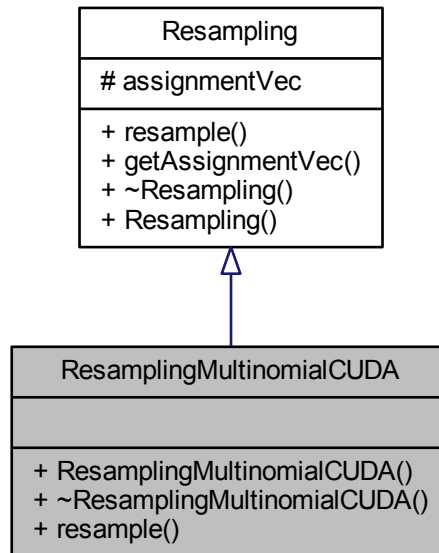
The documentation for this class was generated from the following files:

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_multinomial.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_multinomial.cpp

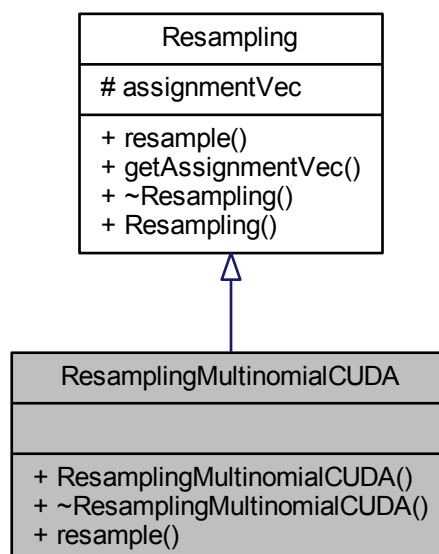


### 3.41 ResamplingMultinomialCUDA Class Reference

Inheritance diagram for ResamplingMultinomialCUDA:



Collaboration diagram for ResamplingMultinomialCUDA:



## Public Member Functions

- [Particles](#) **resample** ([Particles](#) \*)

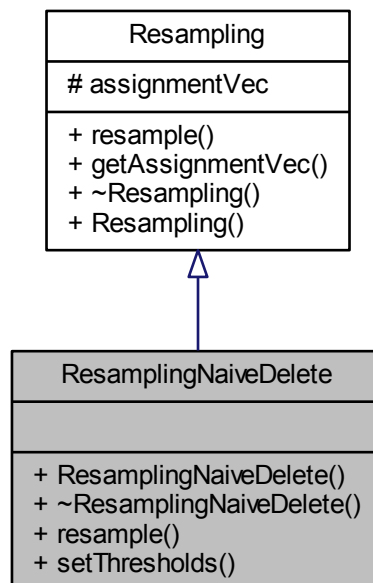
## Additional Inherited Members

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

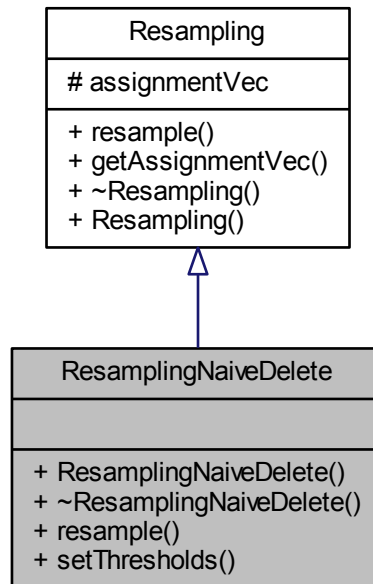
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_multinomial\_cuda.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_multinomial\_cuda.cpp

## 3.42 ResamplingNaiveDelete Class Reference

Inheritance diagram for ResamplingNaiveDelete:



Collaboration diagram for ResamplingNaiveDelete:



## Public Member Functions

- `Particles` **resample** (`Particles *`)
- void **setThresholds** (float, unsigned int)

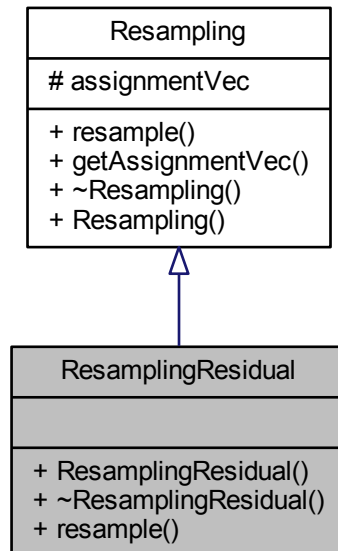
## Additional Inherited Members

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

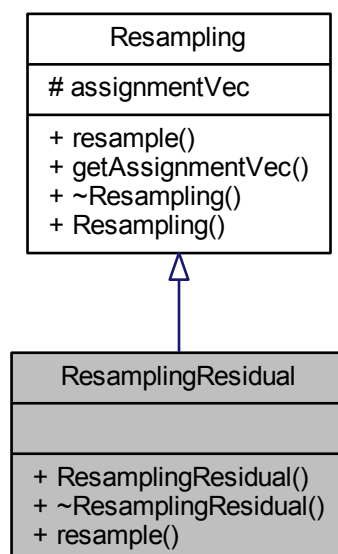
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling_naive_delete.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling_naive_delete.cpp`

### 3.43 ResamplingResidual Class Reference

Inheritance diagram for ResamplingResidual:



Collaboration diagram for ResamplingResidual:



## Public Member Functions

- [Particles](#) **resample** ([Particles](#) \*)

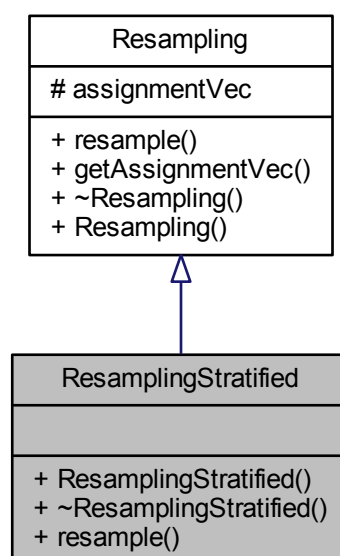
## Additional Inherited Members

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

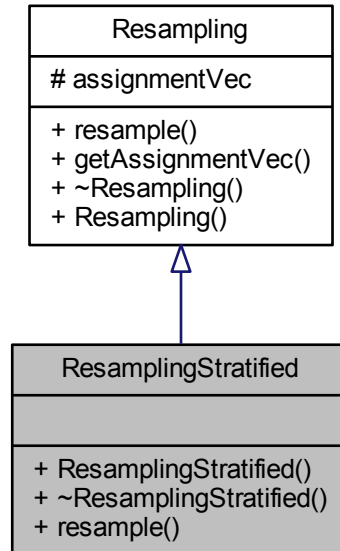
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_residual.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_residual.cpp

## 3.44 ResamplingStratified Class Reference

Inheritance diagram for ResamplingStratified:



Collaboration diagram for ResamplingStratified:



## Public Member Functions

- **Particles** **resample** (**Particles** \*)

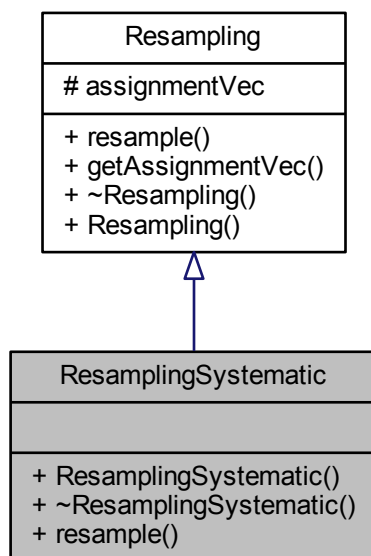
## Additional Inherited Members

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

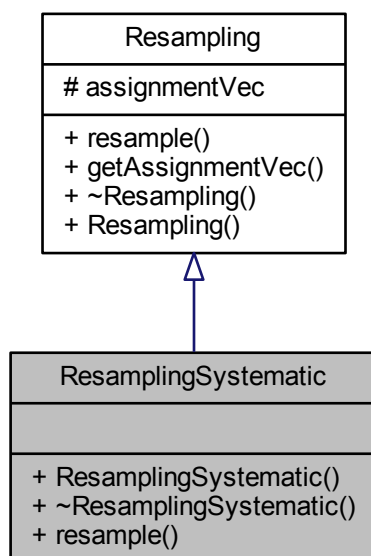
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling_stratified.h`
- `D:/_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling_stratified.cpp`

## 3.45 ResamplingSystematic Class Reference

Inheritance diagram for ResamplingSystematic:



Collaboration diagram for ResamplingSystematic:



## Public Member Functions

- [Particles](#) **resample** ([Particles](#) \*)

## Additional Inherited Members

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

- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_systematic.h
- D:/\_gca/05 Repos/parallel-bayesian-toolbox/src/pbt/resampling\_systematic.cpp



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