sibilla

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Chapter 3

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Chapter 4

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- package sibilla

4.2 Package quasilab.sibilla

Packages

- package core

4.3 Package quasilab.sibilla.core

Classes

- class ExecutionEnvironment

4.4 Package quasylab

Packages

- package sibilla

4.5 Package quasylab.sibilla

Packages

- package core

4.6 Package quasylab.sibilla.core

Packages

- package markov
- package models
- package network
- package past
- package simulator
- package util

4.6.1 Detailed Description

Core package of the project

4.7 Package quasylab.sibilla.core.markov

Classes

- class BoundedReachabilityContinuousSolver
- class BoundedReachabilityDiscreteSolver
- class ContinuousTimeMarkovChain
- class DiscreteTimeMarkovChain
- class FoxGlinnException
- class FoxGlynn
- class MarkovChain
- interface MarkovProcess
- interface RateFunction
- class State
- class SteadyStateSolver
- class TaxiScenarioMC
- class **TestKnutYaoAlgorithm**
- class **TransientCTMC**
- class TransientProbabilityContinuousSolver
- class UnboundedReachabilitySolver
- class VectorState

4.8 Package quasylab.sibilla.core.models

Packages

- package pm

Classes

- interface Action
- interface MarkovProcess
- interface MeasureFunction
- interface Model
- interface ModelDefinition
- interface StatePredicate
- interface StepFunction
- class TimeStep

4.9 Package quasylab.sibilla.core.models.pm

Packages

- package util

Classes

- class BroadcastRule
- class Population
- class PopulationModel
- interface PopulationModelDefinition
- interface PopulationRule
- class PopulationState
- class PopulationTransition
- interface RatePopulationFunction
- class ReactionRule
- class UnicastRule
- class Update

4.10 Package quasylab.sibilla.core.models.pm.util

Classes

- class PopulationRegistry

4.11 Package quasylab.sibilla.core.network

Packages

- package client
- package communication
- package compression
- package master
- package serialization
- package slave
- package util

Classes

- class ComputationResult
- class HostLoggerSupplier
- class NetworkInfo
- class NetworkTask
- class SimulationDataSet

4.11.1 Detailed Description

Contains all the network related classes of the library.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

4.12 Package quasylab.sibilla.core.network.client

Classes

- enum ClientCommand
- class ClientSimulationEnvironment

4.12.1 Detailed Description

Contains the classes that manage the behavior of a client that submits simulations to a master server.

Author

Stelluti Francesco Pio

Zamponi Marco

4.13 Package quasylab.sibilla.core.network.communication

Classes

- interface NetworkManagerType
- class TCPDefaultNetworkManager
- interface TCPNetworkManager
- enum TCPNetworkManagerType
- class TCPSecureNetworkManager
- class UDPDefaultNetworkManager
- interface UDPNetworkManager
- enum UDPNetworkManagerType

4.13.1 Detailed Description

Contains the classes that manage the communication between hosts in the network.

@authore Belenchia Matteo

Author

Stelluti Francesco Pio

Zamponi Marco

4.14 Package quasylab.sibilla.core.network.compression

Classes

- class Compressor

4.14.1 Detailed Description

Contains the classes that manage the data compression and decompression.

Author

Stelluti Francesco Pio

Zamponi Marco

4.15 Package quasylab.sibilla.core.network.master

Classes

- enum MasterCommand
- class MasterServerSimulationEnvironment
- class MasterState
- class NetworkSimulationManager
- class SimulationState

4.15.1 Detailed Description

Contains the classes that manage the behavior of a master that submits clients' simulations received to registered slave servers.

Author

Stelluti Francesco Pio

Zamponi Marco

4.16 Package quasylab.sibilla.core.network.serialization

Classes

- class ClassBytesLoader
- class CustomClassLoader
- class Serializer

4.16.1 Detailed Description

Contains the classes that manage the data serialization.

Author

Stelluti Francesco Pio

Zamponi Marco

4.17 Package quasylab.sibilla.core.network.slave

Classes

- class BasicSimulationServer
- class DiscoverableBasicSimulationServer
- interface SimulationServer
- enum SlaveCommand
- class SlaveState

4.17.1 Detailed Description

Contains the classes that manage the behavior of a slave that receives submitted simulations from a master server.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

4.18 Package quasylab.sibilla.core.network.util

Classes

- class NetworkUtils
- class SSLUtils
- class StartupUtils

4.18.1 Detailed Description

Contains utility classes that are used in the library.

Author

Stelluti Francesco Pio

Zamponi Marco

4.19 Package quasylab.sibilla.core.past

Packages

- package ds

Classes

- interface Activity
- class RandomGeneratorRegistry
- class SequenceOfActivities
- interface SimulationSession
- interface State

4.20 Package quasylab.sibilla.core.past.ds

Classes

- class ActualTemplateField
- class FormalTemplateField
- class GetActivity
- class Template
- interface TemplateField
- class Tuple
- class TupleSpace

4.21 Package quasylab.sibilla.core.simulator

Packages

- package sampling
- package tests
- package util

Classes

- class AbstractSimulationManager
- class DefaultRandomGenerator
- class QueuedSimulationManager
- class SequentialSimulationManager
- class SimulationEnvironment
- interface SimulationManager
- interface SimulationManagerFactory
- interface SimulationMonitor
- enum SimulationStatus
- class SimulationTask
- class SimulationUnit
- class ThreadSimulationManager
- class Trajectory

4.22 Package quasylab.sibilla.core.simulator.sampling

Classes

- interface Measure
- class Sample
- interface SamplePredicate
- class SamplingCollection
- interface SamplingFunction
- class SamplingLog
- class SimulationTimeSeries
- class StatisticSampling

4.23 Package quasylab.sibilla.core.simulator.tests

Packages

- package pm

Classes

- class TestMain
- class TestTime

4.24 Package quasylab.sibilla.core.simulator.tests.pm

Classes

- class GossipBroadcast
- class GossipUnicast
- class RBModel
- class RBModelFactory

4.25 Package quasylab.sibilla.core.simulator.util

Classes

- class ComposedWeightedStructure
- class ModelCompiler
- class ModelPublisher
- class WeightedElement
- class WeightedLinkedList
- interface WeightedStructure
- interface Weighter

4.26 Package quasylab.sibilla.core.util

Classes

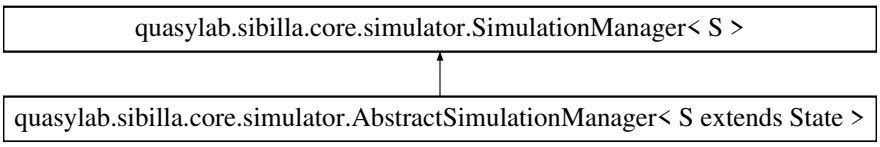
- class Pair
- class SibillaMessages

Chapter 5

Class Documentation

5.1 quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State >:



Public Member Functions

- AbstractSimulationManager (RandomGenerator random, SimulationMonitor monitor, Consumer< Trajectory< S >> trajectoryConsumer)
- synchronized void simulate (SimulationUnit< S > unit)
- SimulationMonitor getMonitor ()
- int computedTrajectories ()
- double averageExecutionTime ()
- synchronized boolean isRunning ()
- void shutdown () throws InterruptedException

Protected Member Functions

- synchronized void handleTrajectory (Trajectory< S > trj)
- abstract void handleTask (SimulationTask< S > simulationTask)
- synchronized void setRunning (boolean flag)
- void notifyMonitorStartInteration (int iterationIndex)
- void notifyMonitorEndInteration (int iterationIndex)

5.1.1 Constructor & Destructor Documentation

5.1.1.1 AbstractSimulationManager()

```
quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State >.AbstractSimulationManager
(
            RandomGenerator random,
            SimulationMonitor monitor,
            Consumer< Trajectory< S >> trajectoryConsumer )
```

5.1.2 Member Function Documentation

5.1.2.1 averageExecutionTime()

```
double quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State >.average↩
ExecutionTime ( )
```

5.1.2.2 computedTrajectories()

```
int quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State >.computed↩
Trajectories ( )
```

5.1.2.3 getMonitor()

```
SimulationMonitor quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State
>.getMonitor ( )
```

5.1.2.4 handleTask()

```
abstract void quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State >.handle↩
Task (
            SimulationTask< S > simulationTask )  [abstract], [protected]
```

5.1.2.5 handleTrajectory()

```
synchronized void quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State
>.handleTrajectory (
            Trajectory< S > trj )  [protected]
```

Handles the trajectory given in input

Parameters

trj	trajectory to be handled

5.1.2.6 isRunning()

```
synchronized boolean quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends
State >.isRunning ( )
```

5.1.2.7 notifyMonitorEndInteration()

```
void quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State >.notify↩
MonitorEndInteration (
            int iterationIndex )  [protected]
```

5.1.2.8 notifyMonitorStartInteration()

```
void quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State >.notify↩
MonitorStartInteration (
            int iterationIndex )  [protected]
```

5.1.2.9 setRunning()

```
synchronized void quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State
>.setRunning (
            boolean flag )  [protected]
```

5.1.2.10 shutdown()

```
void quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State >.shutdown ( )
throws InterruptedException
```

5.1.2.11 simulate()

```
synchronized void quasylab.sibilla.core.simulator.AbstractSimulationManager< S extends State
>.simulate (
            SimulationUnit< S > unit )
```

5.2 quasylab.sibilla.core.models.Action< S > Interface Template Reference

Public Member Functions

- double probability ()
- TimeStep< S > execute (RandomGenerator r)
- S revert ()
- static< S > Action< S > actionOfMarkovStepFunction (double now, double totalRate, double stepRate, S state, StepFunction< S > f)

5.2.1 Detailed Description

Represents an action that may change current state of a model. When action is executed, it duration time is sampled together with the next state. An action is selected with a given probability. Moreover an action can be reverted to obtain the state originating the action.

Parameters

<S>	type of model state.

5.2.2 Member Function Documentation

5.2.2.1 actionOfMarkovStepFunction()

```
static<S> Action<S> quasylab.sibilla.core.models.Action< S >.actionOfMarkovStepFunction (
            double now,
            double totalRate,
            double stepRate,
            S state,
            StepFunction< S > f )
```

Utility method that is used to create the action associated to a transition in a markov process.

Parameters

now	time when the transition is performed.
totalRate	total exit rate of current state.
stepRate	rate of the selected step.
state	current state.
f	lazy function used to compute next state.
<S>	type of states of Markov process.

Returns

the action associated to a transition in a markov process.

5.2.2.2 execute()

```
TimeStep<S> quasylab.sibilla.core.models.Action< S >.execute (
            RandomGenerator r )
```

Returns the model state after action execution. The `RandomGenerator` is the one used by the action to sample possible random values.

Parameters

r	random generator used to sample needed random varibales.

Returns

result of action execution.

5.2.2.3 probability()

```
double quasylab.sibilla.core.models.Action< S >.probability ( )
```

Returns the probability that this action is selected as next step.

Returns

the probability that this action is selected as next step.

5.2.2.4 revert()

```
S quasylab.sibilla.core.models.Action< S >.revert ( )
```

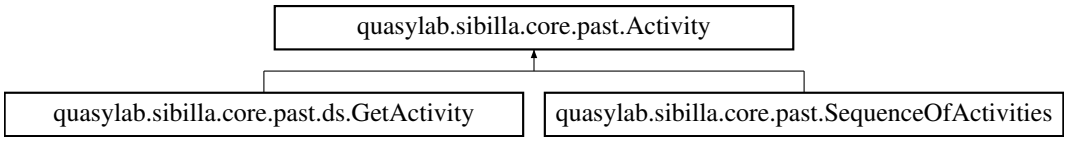
Returns the model state before action execution.

Returns

model state before action execution.

5.3 quasylab.sibilla.core.past.Activity Interface Reference

Inheritance diagram for quasylab.sibilla.core.past.Activity:



Public Member Functions

- String getName ()
- boolean execute (RandomGenerator r, double now, double dt)

5.3.1 Detailed Description

Author

loreti

5.3.2 Member Function Documentation

5.3.2.1 execute()

```
boolean quasylab.sibilla.core.past.Activity.execute (
            RandomGenerator r,
            double now,
            double dt )
```

Implemented in quasylab.sibilla.core.past.ds.GetActivity, and quasylab.sibilla.core.past.SequenceOfActivities.

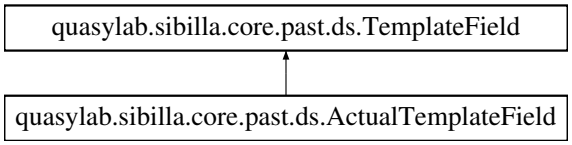
5.3.2.2 getName()

```
String quasylab.sibilla.core.past.Activity.getName ( )
```

Implemented in quasylab.sibilla.core.past.SequenceOfActivities, and quasylab.sibilla.core.past.ds.GetActivity.

5.4 quasylab.sibilla.core.past.ds.ActualTemplateField Class Reference

Inheritance diagram for quasylab.sibilla.core.past.ds.ActualTemplateField:



Public Member Functions

- ActualTemplateField (Object o)
- boolean match (Object o)
- int hashCode ()
- boolean equals (Object obj)
- String toString ()
- boolean implies (TemplateField f)

5.4.1 Detailed Description

Author

loreti

5.4.2 Constructor & Destructor Documentation

5.4.2.1 ActualTemplateField()

```
quasylab.sibilla.core.past.ds.ActualTemplateField.ActualTemplateField (
            Object o )
```

5.4.3 Member Function Documentation

5.4.3.1 equals()

```
boolean quasylab.sibilla.core.past.ds.ActualTemplateField.equals (
            Object obj )
```

5.4.3.2 hashCode()

```
int quasylab.sibilla.core.past.ds.ActualTemplateField.hashCode ( )
```

5.4.3.3 implies()

```
boolean quasylab.sibilla.core.past.ds.ActualTemplateField.implies (
            TemplateField f )
```

Implements quasylab.sibilla.core.past.ds.TemplateField.

5.4.3.4 match()

```
boolean quasylab.sibilla.core.past.ds.ActualTemplateField.match (
            Object o )
```

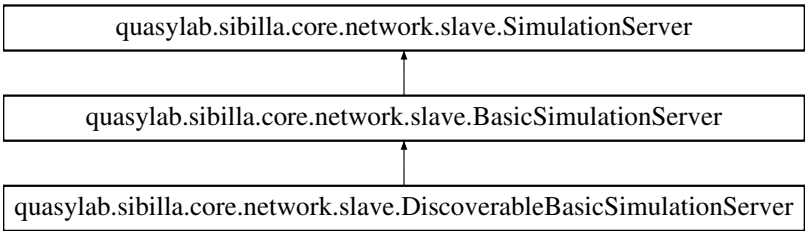
Implements quasylab.sibilla.core.past.ds.TemplateField.

5.4.3.5 toString()

```
String quasylab.sibilla.core.past.ds.ActualTemplateField.toString ( )
```

5.5 quasylab.sibilla.core.network.slave.BasicSimulationServer Class Reference

Inheritance diagram for quasylab.sibilla.core.network.slave.BasicSimulationServer:



Public Member Functions

- BasicSimulationServer (TCPNetworkManagerType networkManagerType)
- void start (int port)

Protected Attributes

- Logger LOGGER
- NetworkInfo localServerInfo

5.5.1 Detailed Description

Represent a simple server that executes the simulations passed by a master server

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.5.2 Constructor & Destructor Documentation

5.5.2.1 BasicSimulationServer()

```
quasylab.sibilla.core.network.slave.BasicSimulationServer.BasicSimulationServer (
            TCPNetworkManagerType networkManagerType )
```

Creates a simulation server with the given network manager type

Parameters

networkManagerType	type of the network manager

5.5.3 Member Function Documentation

5.5.3.1 start()

```
void quasylab.sibilla.core.network.slave.BasicSimulationServer.start (
            int port )
```

Creates and starts the slave server on the given port.

Parameters

port	port used by the slave server to manage the incoming requests from the master servers

Exceptions

IOException	when problems arise in network interfaces usage

Implements quasylab.sibilla.core.network.slave.SimulationServer.

5.5.4 Member Data Documentation

5.5.4.1 localServerInfo

```
NetworkInfo quasylab.sibilla.core.network.slave.BasicSimulationServer.localServerInfo [protected]
```

Slave server network communication related info.

5.5.4.2 LOGGER

```
Logger quasylab.sibilla.core.network.slave.BasicSimulationServer.LOGGER [protected]
```

Class logger.

5.6 quasylab.sibilla.core.markov.BoundedReachabilityContinuousSolver< S > Class Template Reference

Public Member Functions

- BoundedReachabilityContinuousSolver (ContinuousTimeMarkovChain< S > chain, double epsilon, Predicate< S > condition, Predicate< S > goal)
- BoundedReachabilityContinuousSolver (ContinuousTimeMarkovChain< S > chain, double epsilon, Predicate< S > goal)
- Map< S, Double > compute (double t)

5.6.1 Detailed Description

Author

loreti

Parameters

<S>	

5.6.2 Constructor & Destructor Documentation

5.6.2.1 BoundedReachabilityContinuousSolver() [1/2]

```
quasylab.sibilla.core.markov.BoundedReachabilityContinuousSolver< S >.BoundedReachabilityContinuousSolver
(
            ContinuousTimeMarkovChain< S > chain,
            double epsilon,
            Predicate< S > condition,
            Predicate< S > goal )
```

5.6.2.2 BoundedReachabilityContinuousSolver() [2/2]

```
quasylab.sibilla.core.markov.BoundedReachabilityContinuousSolver< S >.BoundedReachabilityContinuousSolver
(
            ContinuousTimeMarkovChain< S > chain,
            double epsilon,
            Predicate< S > goal )
```

5.6.3 Member Function Documentation

5.6.3.1 compute()

```
Map<S,Double> quasylab.sibilla.core.markov.BoundedReachabilityContinuousSolver< S >.compute (
            double t )
```

5.7 quasylab.sibilla.core.markov.BoundedReachabilityDiscreteSolver< S > Class Template Reference

Public Member Functions

- BoundedReachabilityDiscreteSolver (DiscreteTimeMarkovChain< S > chain, Predicate< S > condition, Predicate< S > goal)
- BoundedReachabilityDiscreteSolver (DiscreteTimeMarkovChain< S > chain, Predicate< S > goal)
- Map< S, Double > compute (int k)

5.7.1 Detailed Description

Author

loreti

Parameters

<*S*>	

5.7.2 Constructor & Destructor Documentation

5.7.2.1 BoundedReachabilityDiscreteSolver() [1/2]

```
quasylab.sibilla.core.markov.BoundedReachabilityDiscreteSolver< S >.BoundedReachabilityDiscreteSolver
(
            DiscreteTimeMarkovChain< S > chain,
            Predicate< S > condition,
            Predicate< S > goal )
```

5.7.2.2 BoundedReachabilityDiscreteSolver() [2/2]

```
quasylab.sibilla.core.markov.BoundedReachabilityDiscreteSolver< S >.BoundedReachabilityDiscreteSolver
(
            DiscreteTimeMarkovChain< S > chain,
            Predicate< S > goal )
```

5.7.3 Member Function Documentation

5.7.3.1 compute()

```
Map<S,Double> quasylab.sibilla.core.markov.BoundedReachabilityDiscreteSolver< S >.compute (
            int k )
```

5.8 quasylab.sibilla.core.models.pm.BroadcastRule.BroadcastReceiver Class Reference

Public Member Functions

- BroadcastReceiver (int receiver, Function< PopulationState, Double > receivingProbability, Function< RandomGenerator, Integer > step)
- int getReceiver ()
- Function< PopulationState, Double > getReceivingProbability ()

5.8.1 Constructor & Destructor Documentation

5.8.1.1 BroadcastReceiver()

```
quasylab.sibilla.core.models.pm.BroadcastRule.BroadcastReceiver.BroadcastReceiver (
            int receiver,
            Function< PopulationState, Double > receivingProbability,
            Function< RandomGenerator, Integer > step )
```

Parameters

receiver	
receivingProbability	

5.8.2 Member Function Documentation

5.8.2.1 getReceiver()

```
int quasylab.sibilla.core.models.pm.BroadcastRule.BroadcastReceiver.getReceiver ( )
```

Returns

the receiver

5.8.2.2 getReceivingProbability()

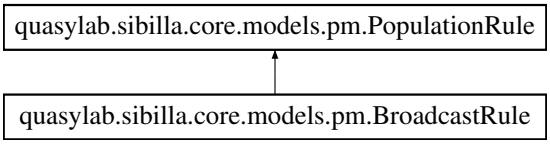
```
Function<PopulationState, Double> quasylab.sibilla.core.models.pm.BroadcastRule.Broadcast↩
Receiver.getReceivingProbability ( )
```

Returns

the receivingProbability

5.9 quasylab.sibilla.core.models.pm.BroadcastRule Class Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.BroadcastRule:



Classes

- class BroadcastReceiver

Public Member Functions

- BroadcastRule (String name, Function< PopulationState, Double > rateFunction, int senderIndex, Function< RandomGenerator, Integer > step, BroadcastReceiver... receivers)
- PopulationTransition apply (RandomGenerator r, double now, PopulationState state)

Static Public Member Functions

- static Update getDrift (String name, RandomGenerator r, int sender, PopulationState state, Function< RandomGenerator, Integer > step, BroadcastReceiver[ ] receivers)

5.9.1 Detailed Description

This kind of rule is used to describe a one-to-many interaction. An element of the population is sending a message that can be received, with a given probabilities, by a group of elements of other species.

5.9.2 Constructor & Destructor Documentation

5.9.2.1 BroadcastRule()

```
quasylab.sibilla.core.models.pm.BroadcastRule.BroadcastRule (
            String name,
            Function< PopulationState, Double > rateFunction,
            int senderIndex,
            Function< RandomGenerator, Integer > step,
            BroadcastReceiver...  receivers )
```

Creates a new rule.

Parameters

name	rule name.
rateFunction	rate function.
senderIndex	index of sender.
step	sender next state.
receivers	message receivers.

5.9.3 Member Function Documentation

5.9.3.1 apply()

```
PopulationTransition quasylab.sibilla.core.models.pm.BroadcastRule.apply (
            RandomGenerator r,
            double now,
            PopulationState state )
```

Apply the rule to a state at a given time.

Parameters

r	randome
now	
state	

Returns

Implements quasylab.sibilla.core.models.pm.PopulationRule.

5.9.3.2 getDrift()

```
static Update quasylab.sibilla.core.models.pm.BroadcastRule.getDrift (
            String name,
            RandomGenerator r,
            int sender,
            PopulationState state,
            Function< RandomGenerator, Integer > step,
            BroadcastReceiver[] receivers )  [static]
```

5.10 quasylab.sibilla.core.network.serialization.ClassBytesLoader Class Reference

Static Public Member Functions

- static byte[] loadClassBytes (String className) throws IOException

5.10.1 Detailed Description

Utility class used to extract the data associated to the .class file of a compiled Java class.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.10.2 Member Function Documentation

5.10.2.1 loadClassBytes()

```
static byte [] quasylab.sibilla.core.network.serialization.ClassBytesLoader.loadClassBytes (
            String className ) throws IOException  [static]
```

Parameters

className	of the class which data need to be extracted.

Returns

byte array containing the data associated to the .class file related to the qualified name passed as an argument.

Exceptions

IOException	

5.11 quasylab.sibilla.core.network.client.ClientCommand Enum Reference

Public Attributes

- INIT
- DATA
- PING
- CLOSE_CONNECTION

5.11.1 Detailed Description

All the possible command that can be sent from a client.

Author

Stelluti Francesco Pio

Zamponi Marco

5.11.2 Member Data Documentation

5.11.2.1 CLOSE_CONNECTION

`quasylab.sibilla.core.network.client.ClientCommand.CLOSE_CONNECTION`

The command sent by a client to inform that the connection with an host will be closed.

5.11.2.2 DATA

`quasylab.sibilla.core.network.client.ClientCommand.DATA`

The command sent by a client to signal that data will be passed over the network.

5.11.2.3 INIT

`quasylab.sibilla.core.network.client.ClientCommand.INIT`

The command sent by a client to initiate a new connection over the network.

5.11.2.4 PING

`quasylab.sibilla.core.network.client.ClientCommand.PING`

The command sent by a client to ping an host which has a connection open with.

5.12 quasylab.sibilla.core.network.client.ClientSimulationEnvironment< S extends State > Class Template Reference

Public Member Functions

- ClientSimulationEnvironment (RandomGenerator random, ModelDefinition< S > modelDefinition, Model< S > model, S initialState, SamplingFunction< S > sampling_function, int replica, double deadline, NetworkInfo masterNetworkInfo)

5.12.1 Detailed Description

Manages the connection with a master server to submit simulations and retrieve related results.

Parameters

<S>	The quasylab.sibilla.core.past.State of the simulation model.

Author

Stelluti Francesco Pio

Zamponi Marco

5.12.2 Constructor & Destructor Documentation

5.12.2.1 ClientSimulationEnvironment()

```
quasylab.sibilla.core.network.client.ClientSimulationEnvironment< S extends State >.ClientSimulationEnvironme
(
            RandomGenerator random,
            ModelDefinition< S > modelDefinition,
            Model< S > model,
            S initialState,
            SamplingFunction< S > sampling_function,
            int replica,
            double deadline,
            NetworkInfo masterNetworkInfo )
```

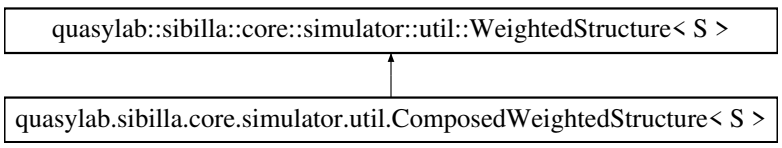
Initiates a new client that submits simulations using the parameters of the simulation to execute and the network related data of the master server that will manage such simulation.

Parameters

random	org.apache.commons.math3.random.RandomGenerator of the simulation.
modelDefinition	quasylab.sibilla.core.models.ModelDefinition that defines the simulation model to be sent.
model	The quasylab.sibilla.core.models.Model of the simulation.
initialState	The initial quasylab.sibilla.core.past.State of the model.
sampling_function	The quasylab.sibilla.core.simulator.sampling.SamplingFunction that will be used to collect data.
replica	Repetitions of the simulation.
deadline	Time interval between two samplings.
masterNetworkInfo	quasylab.sibilla.core.network.NetworkInfo of the master to be reached.

5.13 quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >:



Public Member Functions

- String toString ()
- ComposedWeightedStructure ()

- ComposedWeightedStructure (WeightedStructure< S > left, WeightedStructure< S > right)
- double getTotalWeight ()
- WeightedElement< S > select (double w)
- WeightedStructure< S > add (double w, S s)
- WeightedStructure< S > add (WeightedStructure< S > s)
- List< WeightedElement< S > > getAll ()

5.13.1 Detailed Description

Author

loreti

5.13.2 Constructor & Destructor Documentation

5.13.2.1 ComposedWeightedStructure() [1/2]

```
quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.ComposedWeightedStructure
( )
```

5.13.2.2 ComposedWeightedStructure() [2/2]

```
quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.ComposedWeightedStructure
(
            WeightedStructure< S > left,
            WeightedStructure< S > right )
```

5.13.3 Member Function Documentation

5.13.3.1 add() [1/2]

```
WeightedStructure<S> quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.add
(
            double w,
            S s )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.13.3.2 add() [2/2]

```
WeightedStructure<S> quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.add
(
            WeightedStructure< S > s )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.13.3.3 getAll()

```
List<WeightedElement<S> > quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S
>.getAll ( )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.13.3.4 getTotalWeight()

```
double quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.getTotalWeight ( )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.13.3.5 select()

```
WeightedElement<S> quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.select
(
            double w )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.13.3.6 toString()

```
String quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.toString ( )
```

5.14 quasylab.sibilla.core.network.compression.Compressor Class Reference

Static Public Member Functions

- static byte[ ] compress (byte[ ] decompressedData)
- static byte[ ] decompress (byte[ ] compressedData)

5.14.1 Detailed Description

Utility class used to compress and decompress byte arrays containing data. The class operations are based upon the tool GZIP.

Author

Stelluti Francesco Pio

Zamponi Marco

5.14.2 Member Function Documentation

5.14.2.1 compress()

```
static byte [] quasylab.sibilla.core.network.compression.Compressor.compress (
            byte[] decompressedData )  [static]
```

Compresses a byte array.

Parameters

decompressedData	byte array to be compressed

Returns

compressed byte array

5.14.2.2 decompress()

```
static byte [] quasylab.sibilla.core.network.compression.Compressor.decompress (
            byte[] compressedData )  [static]
```

Decompresses a byte array.

Parameters

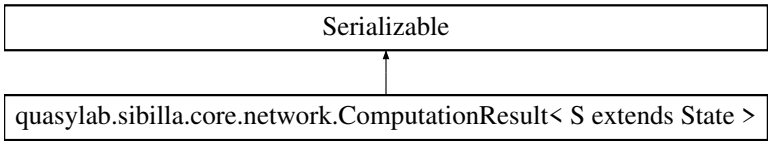
compressedData	byte array to be decompressed

Returns

decompressed byte array

5.15 quasylab.sibilla.core.network.ComputationResult< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.network.ComputationResult< S extends State >:



Public Member Functions

- ComputationResult (LinkedList< Trajectory< S >> results)
- List< Trajectory< S > > getResults ()

5.15.1 Detailed Description

Class that stores the results of a simulation executed by a slave.

Parameters

<S>	The quasylab.sibilla.core.past.State of the simulation model.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.15.2 Constructor & Destructor Documentation

5.15.2.1 ComputationResult()

```
quasylab.sibilla.core.network.ComputationResult< S extends State >.ComputationResult (
            LinkedList< Trajectory< S >> results )
```

Creates a new ComputationResult object with the list of trajectories passed in input

Parameters

results	list of trajectories that compose the result of a simulation

5.15.3 Member Function Documentation

5.15.3.1 getResults()

```
List<Trajectory<S> > quasylab.sibilla.core.network.ComputationResult< S extends State >.getResults ( )
```

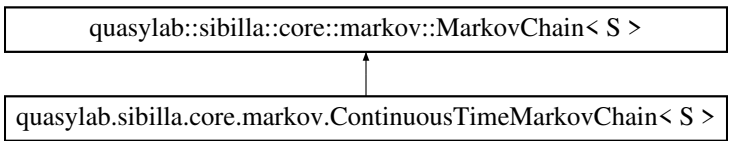
Returns the list of trajectories of a simulation

Returns

list of trajectories that compose the result of a simulation

5.16 quasylab.sibilla.core.markov.ContinuousTimeMarkovChain< S > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.markov.ContinuousTimeMarkovChain< S >:



Public Member Functions

- void add (S s, Map< S, Double > row)
- Map< S, Double > probabilityMatrixRow (S s)
- Map< S, Double > uniformisedMatrixRow (S s)
- Stream< Pair< S, Double > > rateMatrixRow (S s)
- double getMaxRate ()

Additional Inherited Members

5.16.1 Detailed Description

Author

loreti

5.16.2 Member Function Documentation

5.16.2.1 add()

```
void quasylab.sibilla.core.markov.ContinuousTimeMarkovChain< S >.add (
            S s,
            Map< S, Double > row )
```

Reimplemented from quasylab.sibilla.core.markov.MarkovChain< S >.

5.16.2.2 getMaxRate()

```
double quasylab.sibilla.core.markov.ContinuousTimeMarkovChain< S >.getMaxRate ( )
```

5.16.2.3 probabilityMatrixRow()

```
Map<S,Double> quasylab.sibilla.core.markov.ContinuousTimeMarkovChain< S >.probabilityMatrix↩
Row (
            S s )
```

Reimplemented from quasylab.sibilla.core.markov.MarkovChain< S >.

5.16.2.4 rateMatrixRow()

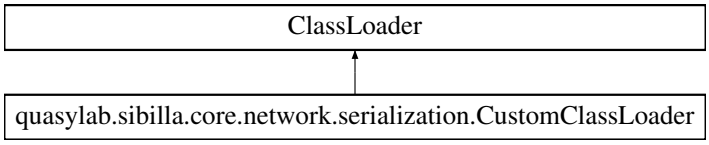
```
Stream<Pair<S, Double> > quasylab.sibilla.core.markov.ContinuousTimeMarkovChain< S >.rate↩
MatrixRow (
            S s )
```

5.16.2.5 uniformisedMatrixRow()

```
Map<S, Double> quasylab.sibilla.core.markov.ContinuousTimeMarkovChain< S >.uniformised↩
MatrixRow (
            S s )
```

5.17 quasylab.sibilla.core.network.serialization.CustomClassLoader Class Reference

Inheritance diagram for quasylab.sibilla.core.network.serialization.CustomClassLoader:



Static Public Member Functions

- static byte[ ] loadClassBytes (String className)
- static byte[ ] removeClassBytes (String className)
- static void defClass (String name, byte[ ] b)

5.17.1 Detailed Description

Utility class used to load the data associated to a .class file into the memory.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.17.2 Member Function Documentation

5.17.2.1 defClass()

```
static void quasylab.sibilla.core.network.serialization.CustomClassLoader.defClass (
            String name,
            byte[] b )  [static]
```

Loads into memory the data associated to a .class file

Parameters

name	of the class to be loaded in memory.
b	byte array containing the data of the class to be loaded in memory.

5.17.2.2 loadClassBytes()

```
static byte [] quasylab.sibilla.core.network.serialization.CustomClassLoader.loadClassBytes (
            String className )  [static]
```

Retrieves the byte array associated to a class name that was previously loaded through this loader.

Parameters

className	the name of the class which byte array data needs to be retrieved.

Returns

byte array associated with the requested class name.

5.17.2.3 removeClassBytes()

```
static byte [] quasylab.sibilla.core.network.serialization.CustomClassLoader.removeClassBytes
(
            String className )  [static]
```

Deletes the byte array associated to a class name that was previously loaded through this loader.

Parameters

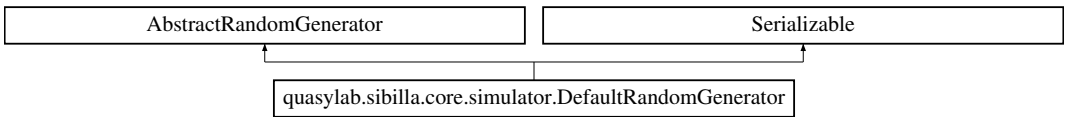
className	the name of the class which byte array data needs to be deleted.

Returns

byte array associated with the requested class name or null if the class wasn't loaded using this loader.

5.18 quasylab.sibilla.core.simulator.DefaultRandomGenerator Class Reference

Inheritance diagram for quasylab.sibilla.core.simulator.DefaultRandomGenerator:



Public Member Functions

- void setSeed (long seed)
- double nextDouble ()

5.18.1 Detailed Description

Default random generator.

5.18.2 Member Function Documentation

5.18.2.1 nextDouble()

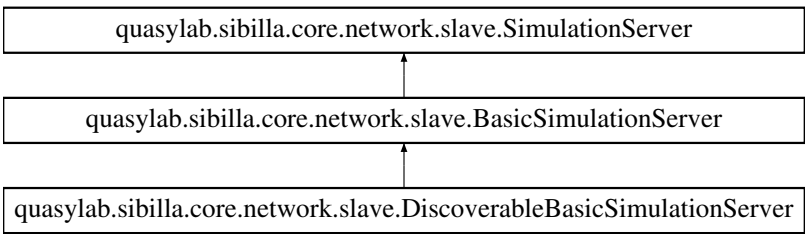
```
double quasylab.sibilla.core.simulator.DefaultRandomGenerator.nextDouble ( )
```

5.18.2.2 setSeed()

```
void quasylab.sibilla.core.simulator.DefaultRandomGenerator.setSeed (
            long seed )
```

5.19 quasylab.sibilla.core.network.slave.DiscoverableBasicSimulationServer Class Reference

Inheritance diagram for quasylab.sibilla.core.network.slave.DiscoverableBasicSimulationServer:



Public Member Functions

- DiscoverableBasicSimulationServer (int localDiscoveryPort, TCPNetworkManagerType simulationNetworkManager, UDPNetworkManagerType discoveryNetworkManager)

Additional Inherited Members

5.19.1 Detailed Description

Extensions of a simple server that executes the simulations passed by a master server. It replies to discovery messages sent from master servers.

Author

Stelluti Francesco Pio

Zamponi Marco

5.19.2 Constructor & Destructor Documentation

5.19.2.1 DiscoverableBasicSimulationServer()

```
quasylab.sibilla.core.network.slave.DiscoverableBasicSimulationServer.DiscoverableBasic↩
SimulationServer (
            int localDiscoveryPort,
            TCPNetworkManagerType simulationNetworkManager,
            UDPNetworkManagerType discoveryNetworkManager )
```

5.20 quasylab.sibilla.core.markov.DiscreteTimeMarkovChain< S > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.markov.DiscreteTimeMarkovChain< S >:

Public Member Functions

- void add (S s, Map< S, Double > row)
- Map< S, Double > probabilityMatrixRow (S s)

Additional Inherited Members

5.20.1 Detailed Description

Author

loreti

5.20.2 Member Function Documentation

5.20.2.1 add()

```
void quasylab.sibilla.core.markov.DiscreteTimeMarkovChain< S >.add (
            S s,
            Map< S, Double > row )
```

Reimplemented from quasylab.sibilla.core.markov.MarkovChain< S >.

5.20.2.2 probabilityMatrixRow()

```
Map<S,Double> quasylab.sibilla.core.markov.DiscreteTimeMarkovChain< S >.probabilityMatrixRow
(
            S s )
```

Reimplemented from quasylab.sibilla.core.markov.MarkovChain< S >.

5.21 quasilab.sibilla.core.ExecutionEnvironment< S extends State > Class Template Reference

Public Member Functions

- ExecutionEnvironment (RandomGenerator rg, Model< S > model, S init)
- S currentState ()
- boolean step ()
- boolean step (Predicate< S > condition)
- boolean previous ()
- boolean restart ()
- double currentTime ()
- int steps ()

5.21.1 Detailed Description

An execution environment has the responsibility to interactively execute a given model.

5.21.2 Constructor & Destructor Documentation

5.21.2.1 ExecutionEnvironment()

```
quasilab.sibilla.core.ExecutionEnvironment< S extends State >.ExecutionEnvironment (
            RandomGenerator rg,
            Model< S > model,
            S init )
```

Create a new ExecutionEnvironment that can be used to execute a given model starting from a specific state.

Parameters

model	model to execute.
init	

5.21.3 Member Function Documentation

5.21.3.1 currentState()

```
S quasilab.sibilla.core.ExecutionEnvironment< S extends State >.currentState ( )
```

Returns current state in the running.

Returns

current state in simulation run.

5.21.3.2 currentTime()

```
double quasilab.sibilla.core.ExecutionEnvironment< S extends State >.currentTime ( )
```

Returns current simulation time.

Returns

current simulation time.

5.21.3.3 previous()

```
boolean quasilab.sibilla.core.ExecutionEnvironment< S extends State >.previous ( )
```

Cancel the last step.

Returns

true if there is a previous state, false otherwise.

5.21.3.4 restart()

```
boolean quasilab.sibilla.core.ExecutionEnvironment< S extends State >.restart ( )
```

Restarts the session.

Returns

true if the session can be restarted, false otherwise.

5.21.3.5 step() [1/2]

```
boolean quasilab.sibilla.core.ExecutionEnvironment< S extends State >.step ( )
```

Performs a step in the run.

Returns

false if current state is a deadlock state, true otherwise.

5.21.3.6 step() [2/2]

```
boolean quasilab.sibilla.core.ExecutionEnvironment< S extends State >.step (
            Predicate< S > condition )
```

Executes the simulation run until a give predicate on the current state is satisfied or a deadlock state is reached.

Parameters

condition	stopping predicate.

Returns

false if current state is a deadlock state, true otherwise.

5.21.3.7 steps()

```
int quasilab.sibilla.core.ExecutionEnvironment< S extends State >.steps ( )
```

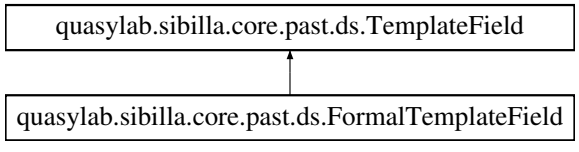
Returns the number of steps.

Returns

the number of steps.

5.22 quasylab.sibilla.core.past.ds.FormalTemplateField Class Reference

Inheritance diagram for quasylab.sibilla.core.past.ds.FormalTemplateField:



Public Member Functions

- FormalTemplateField (Class<?> clazz)
- boolean match (Object o)
- int hashCode ()
- boolean equals (Object obj)
- String toString ()
- boolean implies (TemplateField f)

Protected Attributes

- Class<?> clazz

5.22.1 Detailed Description

Author

loreti

5.22.2 Constructor & Destructor Documentation

5.22.2.1 FormalTemplateField()

```
quasylab.sibilla.core.past.ds.FormalTemplateField.FormalTemplateField (
            Class<?> clazz )
```

5.22.3 Member Function Documentation

5.22.3.1 equals()

```
boolean quasylab.sibilla.core.past.ds.FormalTemplateField.equals (
            Object obj )
```

5.22.3.2 hashCode()

```
int quasylab.sibilla.core.past.ds.FormalTemplateField.hashCode ( )
```

5.22.3.3 implies()

```
boolean quasylab.sibilla.core.past.ds.FormalTemplateField.implies (
            TemplateField f )
```

Implements quasylab.sibilla.core.past.ds.TemplateField.

5.22.3.4 match()

```
boolean quasylab.sibilla.core.past.ds.FormalTemplateField.match (
            Object o )
```

Implements quasylab.sibilla.core.past.ds.TemplateField.

5.22.3.5 toString()

```
String quasylab.sibilla.core.past.ds.FormalTemplateField.toString ( )
```

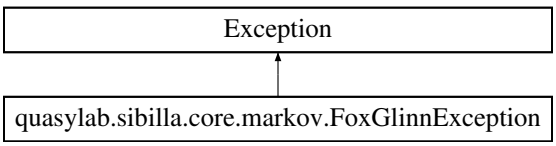
5.22.4 Member Data Documentation

5.22.4.1 clazz

```
Class<?> quasylab.sibilla.core.past.ds.FormalTemplateField.clazz  [protected]
```

5.23 quasylab.sibilla.core.markov.FoxGlinnException Class Reference

Inheritance diagram for quasylab.sibilla.core.markov.FoxGlinnException:



Public Member Functions

- FoxGlinnException (String msg)

5.23.1 Detailed Description

Author

loreti

5.23.2 Constructor & Destructor Documentation

5.23.2.1 FoxGlinnException()

```
quasylab.sibilla.core.markov.FoxGlinnException.FoxGlinnException (
            String msg )
```

5.24 quasylab.sibilla.core.markov.FoxGlynn Class Reference

Public Member Functions

- int leftPoint ()
- int rightPoint ()
- double weight (int i)
- double totalWeight ()
- double poissonProb (int i)

Static Public Member Functions

- static FoxGlynn computeReduced (double lambda, double error)
- static FoxGlynn compute (double lambda, double error)

5.24.1 Detailed Description

Based on https://github.com/oris-tool/sirio/blob/master/sirio/src/main/java/org/oristool/m
FoxGlynn.java

5.24.2 Member Function Documentation

5.24.2.1 compute()

```
static FoxGlynn quasylab.sibilla.core.markov.FoxGlynn.compute (
            double lambda,
            double error )  [static]
```

Computes the Fox-Glynn approximation of Poisson probabilities.

Parameters

lambda	rate of the Poisson distribution
error	the maximum allowed value of probabilities not included

Returns

truncation points and weights/probabilities between them

Exceptions

IllegalStateException	if underflow can occur or the tails cannot be bounded

5.24.2.2 computeReduced()

```
static FoxGlynn quasylab.sibilla.core.markov.FoxGlynn.computeReduced (
            double lambda,
            double error )  [static]
```

Computes a reduced Fox-Glynn approximation of Poisson probabilities.

After bounding tails and computing Poisson probabilities with Fox-Glynn algorithm, a simple heuristic is applied to reduce the size of the distribution (under the target error).

Parameters

lambda	rate of the Poisson distribution
error	the maximum allowed value of probabilities not included

Returns

truncation points and weights/probabilities between them

Exceptions

IllegalStateException	if underflow can occur or the tails cannot be bounded

5.24.2.3 leftPoint()

```
int quasylab.sibilla.core.markov.FoxGlynn.leftPoint ( )
```

Returns the point used to truncate the left tail of the Poisson distribution.

Returns

first point of the Poisson distribution approximation

5.24.2.4 poissonProb()

```
double quasylab.sibilla.core.markov.FoxGlynn.poissonProb (
            int i )
```

Returns the Poisson probability for a point in the approximation.

The input index must belong to the range
`[leftPoint(), rightPoint()]`

.

Parameters

i	time point

Returns

Poisson probability for the given point

Exceptions

IndexOutOfBoundsException	unless `leftPoint() <= i <= rightPoint()`

5.24.2.5 rightPoint()

```
int quasylab.sibilla.core.markov.FoxGlynn.rightPoint ( )
```

Returns the point used to truncate the right tail of the Poisson distribution.

Returns

last point of the Poisson distribution approximation

5.24.2.6 totalWeight()

```
double quasylab.sibilla.core.markov.FoxGlynn.totalWeight ( )
```

Returns a normalization constant for the Poisson approximation.

Returns

normalization constant

5.24.2.7 weight()

```
double quasylab.sibilla.core.markov.FoxGlynn.weight (
            int i )
```

Returns the weight of a point in the approximation.

The input index must belong to the range
`[leftPoint(), rightPoint()]`

.

Parameters

i	time point

Returns

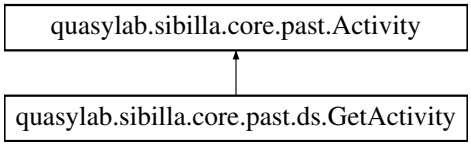
weight for the given point

Exceptions

IndexOutOfBoundsException	unless `leftPoint() <= i <= rightPoint()`

5.25 quasylab.sibilla.core.past.ds.GetActivity Class Reference

Inheritance diagram for quasylab.sibilla.core.past.ds.GetActivity:



Public Member Functions

- GetActivity (TupleSpace.Node node)
- Tuple getTuple ()
- boolean execute (RandomGenerator r, double now, double t)
- String getName ()

5.25.1 Detailed Description

Author

loreti

5.25.2 Constructor & Destructor Documentation

5.25.2.1 GetActivity()

```
quasylab.sibilla.core.past.ds.GetActivity.GetActivity (
            TupleSpace.Node node )
```

5.25.3 Member Function Documentation

5.25.3.1 execute()

```
boolean quasylab.sibilla.core.past.ds.GetActivity.execute (
            RandomGenerator r,
            double now,
            double t )
```

Implements quasylab.sibilla.core.past.Activity.

5.25.3.2 getName()

```
String quasylab.sibilla.core.past.ds.GetActivity.getName ( )
```

Implements quasylab.sibilla.core.past.Activity.

5.25.3.3 getTuple()

```
Tuple quasylab.sibilla.core.past.ds.GetActivity.getTuple ( )
```

5.26 quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast Class Reference

Public Member Functions

- GossipBroadcast (double k, double lambda_s, double lambda_a)
- void run (int scale, int iterations, double deadline, int samplings, String outputDir) throws FileNotFound↩ Exception, InterruptedException

Static Public Member Functions

- static void main (String[ ] argv) throws InterruptedException, FileNotFoundException

Static Public Attributes

- static final int SIZE = 100
- static final int PI_INDEX = 0
- static final int PS_INDEX = 1
- static final int AI_INDEX = 2
- static final int AS_INDEX = 3
- static final int PU_INDEX = 4
- static final int AU_INDEX = 5
- static final double P_RATE = 0.1
- static final double C_RATE = 1.0
- static final double K = 10.0
- static final double REC_PROB = 0.2

5.26.1 Detailed Description

Author

loreti

5.26.2 Constructor & Destructor Documentation

5.26.2.1 GossipBroadcast()

```
quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.GossipBroadcast (
            double k,
            double lambda_s,
            double lambda_a )
```

5.26.3 Member Function Documentation

5.26.3.1 main()

```
static void quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.main (
            String[] argv ) throws InterruptedException, FileNotFoundException  [static]
```

5.26.3.2 run()

```
void quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.run (
            int scale,
            int iterations,
            double deadline,
            int samplings,
            String outputDir ) throws FileNotFoundException, InterruptedException
```

5.26.4 Member Data Documentation

5.26.4.1 AI_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.AI_INDEX = 2  [static]
```

5.26.4.2 AS_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.AS_INDEX = 3  [static]
```

5.26.4.3 AU_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.AU_INDEX = 5  [static]
```

5.26.4.4 C_RATE

```
final double quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.C_RATE = 1.0  [static]
```

5.26.4.5 K

```
final double quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.K = 10.0  [static]
```

5.26.4.6 P_RATE

```
final double quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.P_RATE = 0.1  [static]
```

5.26.4.7 PI_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.PI_INDEX = 0  [static]
```

5.26.4.8 PS_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.PS_INDEX = 1  [static]
```

5.26.4.9 PU_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.PU_INDEX = 4  [static]
```

5.26.4.10 REC_PROB

```
final double quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.REC_PROB = 0.2  [static]
```

5.26.4.11 SIZE

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipBroadcast.SIZE = 100  [static]
```

5.27 quasylab.sibilla.core.simulator.tests.pm.GossipUnicast Class Reference

Public Member Functions

- GossipUnicast (double lambda_s, double lambda_a)
- void run (int scale, int iterations, double deadline, int samplings, String outputDir) throws FileNotFound↩ Exception, InterruptedException

Static Public Member Functions

- static void main (String[ ] argv) throws InterruptedException, FileNotFoundException

Static Public Attributes

- static final int SIZE = 100
- static final int PI_INDEX = 0
- static final int PS_INDEX = 1
- static final int AI_INDEX = 2
- static final int AS_INDEX = 3
- static final int AU_INDEX = 4
- static final int PU_INDEX = 5
- static final double P_RATE = 0.1
- static final double C_RATE = 1.0
- static final double REC_PROB = 0.2

5.27.1 Detailed Description

Author

loreti

5.27.2 Constructor & Destructor Documentation

5.27.2.1 GossipUnicast()

```
quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.GossipUnicast (
            double lambda_s,
            double lambda_a )
```

5.27.3 Member Function Documentation

5.27.3.1 main()

```
static void quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.main (
            String[] argv ) throws InterruptedException, FileNotFoundException  [static]
```

5.27.3.2 run()

```
void quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.run (
            int scale,
            int iterations,
            double deadline,
            int samplings,
            String outputDir ) throws FileNotFoundException, InterruptedException
```

5.27.4 Member Data Documentation

5.27.4.1 AI_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.AI_INDEX = 2  [static]
```

5.27.4.2 AS_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.AS_INDEX = 3  [static]
```

5.27.4.3 AU_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.AU_INDEX = 4  [static]
```

5.27.4.4 C_RATE

```
final double quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.C_RATE = 1.0  [static]
```

5.27.4.5 P_RATE

```
final double quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.P_RATE = 0.1  [static]
```

5.27.4.6 PI_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.PI_INDEX = 0  [static]
```

5.27.4.7 PS_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.PS_INDEX = 1  [static]
```

5.27.4.8 PU_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.PU_INDEX = 5  [static]
```

5.27.4.9 REC_PROB

```
final double quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.REC_PROB = 0.2  [static]
```

5.27.4.10 SIZE

```
final int quasylab.sibilla.core.simulator.tests.pm.GossipUnicast.SIZE = 100  [static]
```

5.28 quasylab.sibilla.core.network.HostLoggerSupplier Class Reference

Public Member Functions

- Logger getLogger ()

Static Public Member Functions

- static HostLoggerSupplier getInstance (String hostName)
- static HostLoggerSupplier getInstance ()

5.28.1 Detailed Description

Class that supplies a singleton Logger instance to be used to log all host's activities. The log is done both on file and console.

Author

Stelluti Francesco Pio

Zamponi Marco

5.28.2 Member Function Documentation

5.28.2.1 getInstance() [1/2]

```
static HostLoggerSupplier quasylab.sibilla.core.network.HostLoggerSupplier.getInstance ( )
[static]
```

5.28.2.2 getInstance() [2/2]

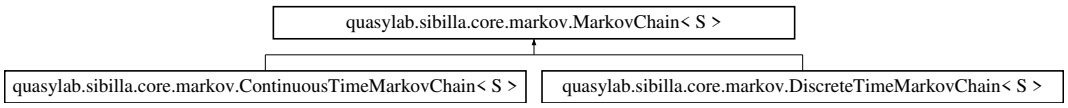
```
static HostLoggerSupplier quasylab.sibilla.core.network.HostLoggerSupplier.getInstance (
            String hostName )  [static]
```

5.28.2.3 getLogger()

```
Logger quasylab.sibilla.core.network.HostLoggerSupplier.getLogger ( )
```

5.29 quasylab.sibilla.core.markov.MarkovChain< S > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.markov.MarkovChain< S >:



Public Member Functions

- MarkovChain ()
- boolean contains (S s)
- int numberOfStates ()
- abstract void add (S s, Map< S, Double > map)
- double sumOfRow (S s)
- double rate (S s1, S s2)
- Set< S > reachSet (Predicate< S > condition, Set< S > nodes)
- Set< S > select (Predicate< S > filter)
- Set< S > getStates ()
- abstract Map< S, Double > probabilityMatrixRow (S s)
- Map< S, Double > forward (Map< S, Double > v)
- Map< S, Double > backward (Map< S, Double > v)
- List< Map< S, Double > > forward (Map< S, Double > v, int steps)
- List< Map< S, Double > > move (Function< Map< S, Double >, Map< S, Double >> transition, Map< S, Double > v, int steps)
- List< Map< S, Double > > backward (Map< S, Double > v, int steps)
- Set< S > next (S s)

Static Public Member Functions

- static< S, M extends MarkovChain< S > M generateMarkovChain (Supplier< M > builder, S init, Function< S, Map< S, Double >> stepFunction)
- static< S > Map< S, Double > move (Map< S, Map< S, Double >> transition, Map< S, Double > v)
- static< S > void addTo (Map< S, Double > m, S s, double v)
- static< S > Map< S, Double > sum (Map< S, Double > m1, Map< S, Double > m2)
- static< S > RealMatrix generateMatrix (IntFunction< RealMatrix > matrixBuilder, Function< S, Stream< Map.Entry< S, Double >>> rowFunction, Map< S, Integer > index)
- static< S > RealVector generateVector (IntFunction< RealVector > vectorBuilder, Map< S, Integer > index, Function< S, Double > init)

Protected Member Functions

- double addToRow (S s, Map< S, Double > row)
- Map< S, Double > getRow (S s)
- void createIfNotExists (S s)

5.29.1 Detailed Description

Author

loreti

5.29.2 Constructor & Destructor Documentation

5.29.2.1 MarkovChain()

```
quasylab.sibilla.core.markov.MarkovChain< S >.MarkovChain ( )
```

5.29.3 Member Function Documentation

5.29.3.1 add()

```
abstract void quasylab.sibilla.core.markov.MarkovChain< S >.add (
            S s,
            Map< S, Double > map )  [abstract]
```

Reimplemented in quasylab.sibilla.core.markov.DiscreteTimeMarkovChain< S >, and quasylab.sibilla.core.markov.ContinuousTimeM

5.29.3.2 addTo()

```
static <S> void quasylab.sibilla.core.markov.MarkovChain< S >.addTo (
            Map< S, Double > m,
            S s,
            double v )  [static]
```

5.29.3.3 addToRow()

```
double quasylab.sibilla.core.markov.MarkovChain< S >.addToRow (
            S s,
            Map< S, Double > row )  [protected]
```

5.29.3.4 backward() [1/2]

```
Map<S,Double> quasylab.sibilla.core.markov.MarkovChain< S >.backward (
            Map< S, Double > v )
```

5.29.3.5 backward() [2/2]

```
List<Map<S,Double> > quasylab.sibilla.core.markov.MarkovChain< S >.backward (
            Map< S, Double > v,
            int steps )
```

5.29.3.6 contains()

```
boolean quasylab.sibilla.core.markov.MarkovChain< S >.contains (
            S s )
```

5.29.3.7 createIfNotExists()

```
void quasylab.sibilla.core.markov.MarkovChain< S >.createIfNotExists (
            S s )  [protected]
```

5.29.3.8 forward() [1/2]

```
Map<S,Double> quasylab.sibilla.core.markov.MarkovChain< S >.forward (
            Map< S, Double > v )
```

5.29.3.9 forward() [2/2]

```
List<Map<S,Double> > quasylab.sibilla.core.markov.MarkovChain< S >.forward (
            Map< S, Double > v,
            int steps )
```

5.29.3.10 generateMarkovChain()

```
static <S, M extends MarkovChain<S> M quasylab.sibilla.core.markov.MarkovChain< S >.generate↩
MarkovChain (
            Supplier< M > builder,
            S init,
            Function< S, Map< S, Double >> stepFunction )  [static]
```

5.29.3.11 generateMatrix()

```
static <S> RealMatrix quasylab.sibilla.core.markov.MarkovChain< S >.generateMatrix (
            IntFunction< RealMatrix > matrixBuilder,
            Function< S, Stream< Map.Entry< S, Double >>> rowFunction,
            Map< S, Integer > index )  [static]
```

5.29.3.12 generateVector()

```
static <S> RealVector quasylab.sibilla.core.markov.MarkovChain< S >.generateVector (
            IntFunction< RealVector > vectorBuilder,
            Map< S, Integer > index,
            Function< S, Double > init )  [static]
```

5.29.3.13 getRow()

```
Map<S,Double> quasylab.sibilla.core.markov.MarkovChain< S >.getRow (
            S s )  [protected]
```

5.29.3.14 getStates()

```
Set<S> quasylab.sibilla.core.markov.MarkovChain< S >.getStates ( )
```

5.29.3.15 move() [1/2]

```
List<Map<S, Double> > quasylab.sibilla.core.markov.MarkovChain< S >.move (
            Function< Map< S, Double >, Map< S, Double >> transition,
            Map< S, Double > v,
            int steps )
```

5.29.3.16 move() [2/2]

```
static <S> Map<S,Double> quasylab.sibilla.core.markov.MarkovChain< S >.move (
            Map< S, Map< S, Double >> transition,
            Map< S, Double > v )  [static]
```

5.29.3.17 next()

```
Set<S> quasylab.sibilla.core.markov.MarkovChain< S >.next (
            S s )
```

5.29.3.18 numberOfStates()

```
int quasylab.sibilla.core.markov.MarkovChain< S >.numberOfStates ( )
```

5.29.3.19 probabilityMatrixRow()

```
abstract Map<S,Double> quasylab.sibilla.core.markov.MarkovChain< S >.probabilityMatrixRow (
            S s )  [abstract]
```

Reimplemented in quasylab.sibilla.core.markov.DiscreteTimeMarkovChain< S >, and quasylab.sibilla.core.markov.ContinuousTimeM

5.29.3.20 rate()

```
double quasylab.sibilla.core.markov.MarkovChain< S >.rate (
            S s1,
            S s2 )
```

5.29.3.21 reachSet()

```
Set<S> quasylab.sibilla.core.markov.MarkovChain< S >.reachSet (
            Predicate< S > condition,
            Set< S > nodes )
```

5.29.3.22 select()

```
Set<S> quasylab.sibilla.core.markov.MarkovChain< S >.select (
            Predicate< S > filter )
```

5.29.3.23 sum()

```
static <S> Map<S,Double> quasylab.sibilla.core.markov.MarkovChain< S >.sum (
            Map< S, Double > m1,
            Map< S, Double > m2 )  [static]
```

5.29.3.24 sumOfRow()

```
double quasylab.sibilla.core.markov.MarkovChain< S >.sumOfRow (
            S s )
```

5.30 quasylab.sibilla.core.markov.MarkovProcess< S > Interface Template Reference

Public Member Functions

- Map< S, Double > next (S state)

5.30.1 Detailed Description

Author

loreti

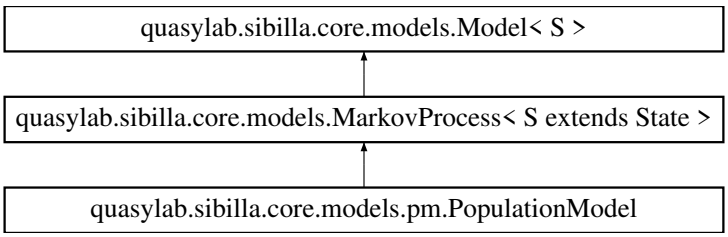
5.30.2 Member Function Documentation

5.30.2.1 next()

```
Map<S,Double> quasylab.sibilla.core.markov.MarkovProcess< S >.next (
            S state )
```

5.31 quasylab.sibilla.core.models.MarkovProcess< S extends State > Interface Template Reference

Inheritance diagram for quasylab.sibilla.core.models.MarkovProcess< S extends State >:



Public Member Functions

- WeightedStructure< StepFunction< S > > getTransitions (RandomGenerator r, double time, S s)
- default TimeStep< S > next (RandomGenerator r, double time, S state)
- default List< Action< S > > actions (RandomGenerator r, double time, S state)

Static Public Member Functions

- static double sampleExponentialDistribution (double rate, RandomGenerator r)

5.31.1 Detailed Description

This is a model implementing a Markov process.

5.31.2 Member Function Documentation

5.31.2.1 actions()

```
default List<Action<S> > quasylab.sibilla.core.models.MarkovProcess< S extends State >.actions
(
            RandomGenerator r,
            double time,
            S state )
```

5.31.2.2 getTransitions()

```
WeightedStructure<StepFunction<S> > quasylab.sibilla.core.models.MarkovProcess< S extends
State >.getTransitions (
            RandomGenerator r,
            double time,
            S s )
```

Returns the transitions enabled in a given state at a given time. Each transition is represented via a `StepFunction`, and all the enabled transitions are stored in a `WeightedStructure` that associates each function with its rate.

Parameters

r	random generator used to sample needed random varibales.
time	current time.
s	current state.

Returns

the weighted structure with all the enabled transitions.

5.31.2.3 next()

```
default TimeStep<S> quasylab.sibilla.core.models.MarkovProcess< S extends State >.next (
            RandomGenerator r,
            double time,
            S state )
```

5.31.2.4 sampleExponentialDistribution()

```
static double quasylab.sibilla.core.models.MarkovProcess< S extends State >.sampleExponential↩
Distribution (
            double rate,
            RandomGenerator r )  [static]
```

Sample a random value of a random variable exponentially distributed with parameter `rate`.

Parameters

rate	a positive value representing the parameter of an exponentially distributed random variable.
r	a random generator.

Returns

a random value sampled from an exponentially distributed random variable with parameter `rate`.

5.32 quasylab.sibilla.core.network.master.MasterCommand Enum Reference

Public Attributes

- INIT
- PING
- TASK
- RESULTS
- PONG
- INIT_RESPONSE
- DATA_RESPONSE
- CLOSE_CONNECTION

5.32.1 Detailed Description

All the possible command and signals that can be sent from a master server.

Author

Stelluti Francesco Pio

Zamponi Marco

5.32.2 Member Data Documentation

5.32.2.1 CLOSE_CONNECTION

`quasylab.sibilla.core.network.master.MasterCommand.CLOSE_CONNECTION`

The command sent by a master server to inform that the connection with an host will be closed.

5.32.2.2 DATA_RESPONSE

`quasylab.sibilla.core.network.master.MasterCommand.DATA_RESPONSE`

The command sent by a master server that has received a DATA command from a client.

5.32.2.3 INIT

`quasylab.sibilla.core.network.master.MasterCommand.INIT`

The command sent by a master server to initiate a new connection over the network.

5.32.2.4 INIT_RESPONSE

`quasylab.sibilla.core.network.master.MasterCommand.INIT_RESPONSE`

The command sent by a master server that has received an INIT command from a client.

5.32.2.5 PING

`quasylab.sibilla.core.network.master.MasterCommand.PING`

The command sent by a master server to ping an host which has a connection open with.

5.32.2.6 PONG

`quasylab.sibilla.core.network.master.MasterCommand.PONG`

The command sent by a master server to reply to a ping request received by an host.

5.32.2.7 RESULTS

`quasylab.sibilla.core.network.master.MasterCommand.RESULTS`

The command sent by a master server to inform that a batch of simulations' results will be sent over the network connection.

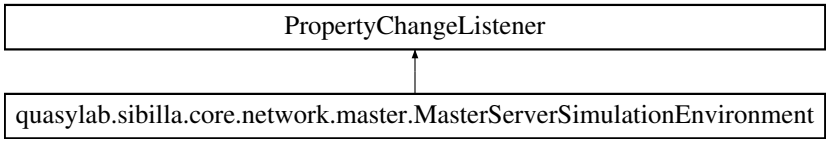
5.32.2.8 TASK

`quasylab.sibilla.core.network.master.MasterCommand.TASK`

The command sent by a master server to inform that a batch of tasks will be sent over the network connection.

5.33 quasylab.sibilla.core.network.master.MasterServerSimulationEnvironment Class Reference

Inheritance diagram for quasylab.sibilla.core.network.master.MasterServerSimulationEnvironment:



Public Member Functions

- MasterServerSimulationEnvironment (int localDiscoveryPort, int remoteDiscoveryPort, UDPNetworkManagerType discoveryNetworkManager, int localSimulationPort, TCPNetworkManagerType simulationNetworkManager, PropertyChangeListener... listeners)
- void propertyChange (PropertyChangeEvent evt)

5.33.1 Detailed Description

Manages connection with clients and slave servers to execute and manage the simulations' tasks and their results over network connections.

Author

Stelluti Francesco Pio

Zamponi Marco

5.33.2 Constructor & Destructor Documentation

5.33.2.1 MasterServerSimulationEnvironment()

```
quasylab.sibilla.core.network.master.MasterServerSimulationEnvironment.MasterServerSimulation↩
Environment (
             int localDiscoveryPort,
             int remoteDiscoveryPort,
             UDPNetworkManagerType discoveryNetworkManager,
             int localSimulationPort,
             TCPNetworkManagerType simulationNetworkManager,
             PropertyChangeListener...  listeners )
```

Creates and starts up a master server with the given parameters.

Parameters

localDiscoveryPort	port used by the master server to manage the incoming slave servers' registration requests.
remoteDiscoveryPort	port used by the slave servers to manage the incoming master server discovery message.
discoveryNetworkManager	quasylab.sibilla.core.network.communication.UDPNetworkManagerType of UDP network communication that will be used during the slave servers' discovery by the master.
localSimulationPort	port used by the master server to manage the incoming clients' simulation requests.
simulationNetworkManager	quasylab.sibilla.core.network.communication.TCPNetworkManagerType of TCP network communication that will be used between master server and clients.
listeners	java.beans.PropertyChangeListener instances that will be updated about the state of this master server.

5.33.3 Member Function Documentation

5.33.3.1 propertyChange()

```
void quasylab.sibilla.core.network.master.MasterServerSimulationEnvironment.propertyChange (
            PropertyChangeEvent evt )
```

5.34 quasylab.sibilla.core.network.master.MasterState Class Reference

Inheritance diagram for quasylab.sibilla.core.network.master.MasterState:

Public Member Functions

- MasterState (NetworkInfo masterNetworkInfo)
- synchronized void addSimulation (SimulationState simulationState)
- synchronized Set< NetworkInfo > getSlaveServersNetworkInfos ()
- synchronized Set< SimulationState > getSimulationStates ()
- synchronized boolean removeSimulation (SimulationState simulationState)
- synchronized void addPropertyChangeListener (String property, PropertyChangeListener pcl)
- synchronized void increaseExecutedSimulations ()
- synchronized boolean addSlaveServer (NetworkInfo slaveNetworkInfo)
- synchronized boolean removeSlaveServer (NetworkInfo slaveNetworkInfo)
- void propertyChange (PropertyChangeEvent evt)
- synchronized NetworkInfo getMasterNetworkInfo ()
- synchronized int getConnectedSlaveServers ()
- synchronized int getExecutedSimulations ()
- synchronized Date getMasterServerStartDate ()
- MasterState clone ()
- boolean equals (Object o)
- int hashCode ()
- int compareTo (MasterState masterState)

5.34.1 Detailed Description

Wraps the state of a master server. Its updates can be listened by java.beans.PropertyChangeListener instances.

Author

Stelluti Francesco Pio

Zamponi Marco

5.34.2 Constructor & Destructor Documentation

5.34.2.1 MasterState()

```
quasylab.sibilla.core.network.master.MasterState.MasterState (
            NetworkInfo masterNetworkInfo )
```

Initializes the state.

Parameters

masterNetworkInfo	The network related informations about this master server.

5.34.3 Member Function Documentation

5.34.3.1 addPropertyChangeListener()

```
synchronized void quasylab.sibilla.core.network.master.MasterState.addPropertyChangeListener (
            String property,
            PropertyChangeListener pcl )
```

5.34.3.2 addSimulation()

```
synchronized void quasylab.sibilla.core.network.master.MasterState.addSimulation (
            SimulationState simulationState )
```

Registers a client submitted simulation.

Parameters

simulationState	state associated with the simulation.

5.34.3.3 addSlaveServer()

```
synchronized boolean quasylab.sibilla.core.network.master.MasterState.addSlaveServer (
            NetworkInfo slaveNetworkInfo )
```

Registers a new slave server.

Parameters

slaveNetworkInfo	related to the to be registered slave server.

Returns

java.lang.Boolean that indicates the result of the operation.

5.34.3.4 clone()

```
MasterState quasylab.sibilla.core.network.master.MasterState.clone ( )
```

5.34.3.5 compareTo()

```
int quasylab.sibilla.core.network.master.MasterState.compareTo (
            MasterState masterState )
```

Compares two master states for ordering.

Parameters

masterState	the quasylab.sibilla.core.network.master.MasterState to be compared.

Returns

the result of the compareTo method called on the masterServerStartDate instance.

5.34.3.6 equals()

```
boolean quasylab.sibilla.core.network.master.MasterState.equals (
            Object o )
```

5.34.3.7 getConnectedSlaveServers()

```
synchronized int quasylab.sibilla.core.network.master.MasterState.getConnectedSlaveServers ( )
```

Returns

the number of slave servers currently registered.

5.34.3.8 getExecutedSimulations()

```
synchronized int quasylab.sibilla.core.network.master.MasterState.getExecutedSimulations ( )
```

Returns

The number of client submitted simulations that have been executed since the startup of the master server.

5.34.3.9 getMasterNetworkInfo()

```
synchronized NetworkInfo quasylab.sibilla.core.network.master.MasterState.getMasterNetworkInfo
( )
```

Returns

the network related informations about this master server.

5.34.3.10 getMasterServerStartDate()

```
synchronized Date quasylab.sibilla.core.network.master.MasterState.getMasterServerStartDate (
)
```

Returns

The date the master server started its execution.

5.34.3.11 getSimulationStates()

```
synchronized Set<SimulationState> quasylab.sibilla.core.network.master.MasterState.getSimulation↩
States ( )
```

Returns

java.util.Set related to submitted simulation states.

5.34.3.12 getSlaveServersNetworkInfos()

```
synchronized Set<NetworkInfo> quasylab.sibilla.core.network.master.MasterState.getSlave↩
ServersNetworkInfos ( )
```

Returns

java.util.Set related to registered slave servers.

5.34.3.13 hashCode()

```
int quasylab.sibilla.core.network.master.MasterState.hashCode ( )
```

5.34.3.14 increaseExecutedSimulations()

```
synchronized void quasylab.sibilla.core.network.master.MasterState.increaseExecutedSimulations
( )
```

Increases the number of client submitted simulations that have been executed since the startup of the master server.

5.34.3.15 propertyChange()

```
void quasylab.sibilla.core.network.master.MasterState.propertyChange (
            PropertyChangeEvent evt )
```

5.34.3.16 removeSimulation()

```
synchronized boolean quasylab.sibilla.core.network.master.MasterState.removeSimulation (
            SimulationState simulationState )
```

Removes a quasylab.sibilla.core.network.master.SimulationState.

Parameters

simulationState	the state to be removed.

Returns

java.lang.Boolean that indicates the result of the operation.

5.34.3.17 removeSlaveServer()

```
synchronized boolean quasylab.sibilla.core.network.master.MasterState.removeSlaveServer (
            NetworkInfo slaveNetworkInfo )
```

Unregisters a slave server.

Parameters

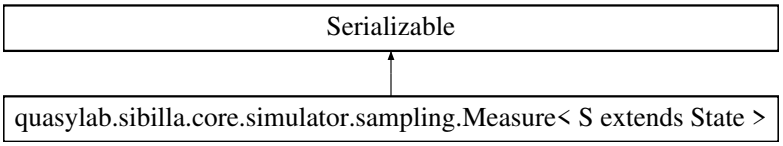
slaveNetworkInfo	related to the to be unregistered slave server.

Returns

java.lang.Boolean that indicates the result of the operation.

5.35 quasylab.sibilla.core.simulator.sampling.Measure< S extends State > Interface Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.sampling.Measure< S extends State >:



Public Member Functions

- double measure (S t)
- String getName ()

5.35.1 Detailed Description

Author

loreti

5.35.2 Member Function Documentation

5.35.2.1 getName()

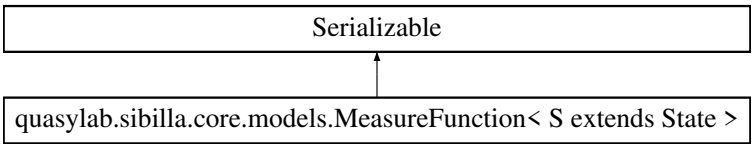
```
String quasylab.sibilla.core.simulator.sampling.Measure< S extends State >.getName ( )
```

5.35.2.2 measure()

```
double quasylab.sibilla.core.simulator.sampling.Measure< S extends State >.measure (
            S t )
```

5.36 quasylab.sibilla.core.models.MeasureFunction< S extends State > Interface Template Reference

Inheritance diagram for quasylab.sibilla.core.models.MeasureFunction< S extends State >:



Public Member Functions

- double apply (S state)

5.36.1 Detailed Description

A measure is a function associating each state with a real value.

Parameters

<*S*>	data type of states.

5.36.2 Member Function Documentation

5.36.2.1 apply()

```
double quasylab.sibilla.core.models.MeasureFunction< S extends State >.apply (
            S state )
```

Returns a double value associated with a state.

Parameters

state	a state

Returns

the double value associated with the parameters.

5.37 quasylab.sibilla.core.models.Model< S extends State > Interface Template Reference

Public Member Functions

- TimeStep< S > next (RandomGenerator r, double time, S state)
- List< Action< S > > actions (RandomGenerator r, double time, S state)
- ModelDefinition< S > getModelDefinition ()

5.37.1 Detailed Description

Represents a *Stochastic Process*.

Parameters

<S>	data type for the state of the process.

5.37.2 Member Function Documentation

5.37.2.1 actions()

```
List<Action<S> > quasylab.sibilla.core.models.Model< S extends State >.actions (
            RandomGenerator r,
            double time,
            S state )
```

Returns the list of actions that are enabled when the process a a given time is in a given state.

Parameters

r	random generator used to sample needed random values.
time	current time.
state	current state.

Returns

list of enabled actions.

5.37.2.2 getModelDefinition()

```
ModelDefinition<S> quasylab.sibilla.core.models.Model< S extends State >.getModelDefinition (
)
```

5.37.2.3 next()

```
TimeStep<S> quasylab.sibilla.core.models.Model< S extends State >.next (
            RandomGenerator r,
            double time,
            S state )
```

Samples possible next state when the process is in a given state at a given time. A random generator is passed to sample random values when needed.

Parameters

r	random generator used to sample needed random values.
time	current time.
state	current state.

Returns

process time step.

5.38 quasylab.sibilla.core.simulator.util.ModelCompiler Class Reference

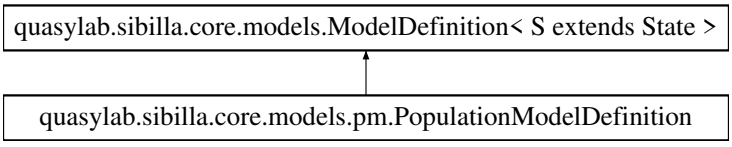
5.38.1 Detailed Description

Author

loreti

5.39 quasylab.sibilla.core.models.ModelDefinition< S extends State > Interface Template Reference

Inheritance diagram for quasylab.sibilla.core.models.ModelDefinition< S extends State >:



Public Member Functions

- int stateArity ()
- int modelArity ()
- S state (double ... parameters)
- Model< S > createModel (double ... args)

5.39.1 Detailed Description

This interface implements a factory that can be used to build a model that according to some parameters.

Parameters

<S>	

5.39.2 Member Function Documentation

5.39.2.1 createModel()

```
Model<S> quasylab.sibilla.core.models.ModelDefinition< S extends State >.createModel (
            double ...  args )
```

Creates a new Model from a given set of parameters.

Parameters

args	model arguments

Returns

a model built from a given set of parameters.

5.39.2.2 modelArity()

```
int quasylab.sibilla.core.models.ModelDefinition< S extends State >.modelArity ( )
```

Returns the number of parameters needed to build a model.

Returns

the number of parameters needed to build a model.

5.39.2.3 state()

```
S quasylab.sibilla.core.models.ModelDefinition< S extends State >.state (
            double ...  parameters )
```

Create the default state (that is the first one defined in the factory) with the given parameters.

Parameters

parameters	parameters to use in state creation.

Returns

the default state associated the given parameters.

5.39.2.4 stateArity()

```
int quasylab.sibilla.core.models.ModelDefinition< S extends State >.stateArity ( )
```

Returns the number of parameters needed to build a state.

Returns

the number of parameters needed to build a state.

5.40 quasylab.sibilla.core.simulator.util.ModelPublisher Class Reference

Public Member Functions

- ModelPublisher (String outputDirectory) throws MalformedURLException
- boolean buildClass (File ... files)

5.40.1 Detailed Description

Author

loreti

5.40.2 Constructor & Destructor Documentation

5.40.2.1 ModelPublisher()

```
quasylab.sibilla.core.simulator.util.ModelPublisher.ModelPublisher (
            String outputDirectory ) throws MalformedURLException
```

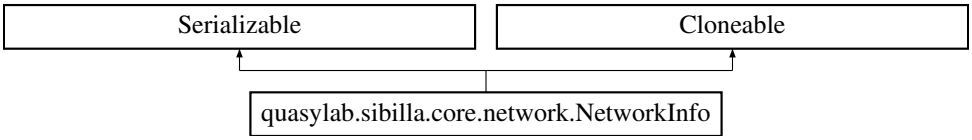
5.40.3 Member Function Documentation

5.40.3.1 buildClass()

```
boolean quasylab.sibilla.core.simulator.util.ModelPublisher.buildClass (
            File ...  files )
```

5.41 quasylab.sibilla.core.network.NetworkInfo Class Reference

Inheritance diagram for quasylab.sibilla.core.network.NetworkInfo:



Public Member Functions

- NetworkInfo (InetAddress address, int port, NetworkManagerType serType)
- InetAddress getAddress ()
- int getPort ()
- NetworkManagerType getType ()
- String toString ()
- int hashCode ()
- boolean equals (Object obj)
- NetworkInfo clone ()

5.41.1 Detailed Description

Class that stores info about the connection with a server

Author

Stelluti Francesco Pio

Zamponi Marco

5.41.2 Constructor & Destructor Documentation

5.41.2.1 NetworkInfo()

```
quasylab.sibilla.core.network.NetworkInfo.NetworkInfo (
            InetAddress address,
            int port,
            NetworkManagerType serType )
```

Creates a new NetworkInfo object with the parameters given in input

Parameters

address	address of the server
port	port the server listens to
serType	type of the network manager used by the server

5.41.3 Member Function Documentation

5.41.3.1 clone()

```
NetworkInfo quasylab.sibilla.core.network.NetworkInfo.clone ( )
```

5.41.3.2 equals()

```
boolean quasylab.sibilla.core.network.NetworkInfo.equals (
            Object obj )
```

5.41.3.3 getAddress()

```
InetAddress quasylab.sibilla.core.network.NetworkInfo.getAddress ( )
```

Returns the address of the server

Returns

address of the server

5.41.3.4 getPort()

```
int quasylab.sibilla.core.network.NetworkInfo.getPort ( )
```

Returns the port the server listens to

Returns

port the server listens to

5.41.3.5 getType()

```
NetworkManagerType quasylab.sibilla.core.network.NetworkInfo.getType ( )
```

Returns the type of network manager used by the server.

Returns

type of network manager used by the server.

5.41.3.6 hashCode()

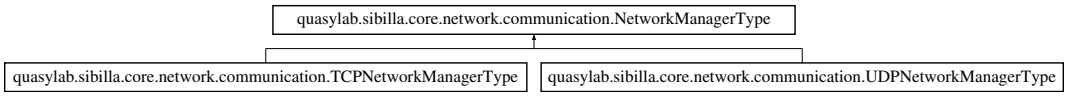
```
int quasylab.sibilla.core.network.NetworkInfo.hashCode ( )
```

5.41.3.7 toString()

```
String quasylab.sibilla.core.network.NetworkInfo.toString ( )
```

5.42 quasylab.sibilla.core.network.communication.NetworkManagerType Interface Reference

Inheritance diagram for quasylab.sibilla.core.network.communication.NetworkManagerType:



5.42.1 Detailed Description

Interface that needs to be implemented by all of the enum classes related to communication oriented classes that are based upon TCP/IP transport layer protocols.

Author

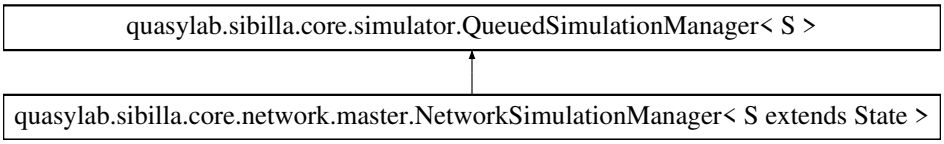
Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.43 quasylab.sibilla.core.network.master.NetworkSimulationManager< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.network.master.NetworkSimulationManager< S extends State >:



Public Member Functions

- NetworkSimulationManager (RandomGenerator random, Consumer< Trajectory< S >> consumer, SimulationMonitor monitor, ModelDefinition< S > modelDefinition, SimulationState simulationState)
- synchronized void join () throws InterruptedException

Static Public Member Functions

- static SimulationManagerFactory getNetworkSimulationManagerFactory (SimulationState simulationState)

Protected Member Functions

- void startTasksHandling ()

5.43.1 Detailed Description

Handles and coordinates a simulation between the slave servers

Parameters

<S>	The quasylab.sibilla.core.past.State of the simulation model.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.43.2 Constructor & Destructor Documentation

5.43.2.1 NetworkSimulationManager()

```
quasylab.sibilla.core.network.master.NetworkSimulationManager< S extends State >.NetworkSimulationManager
(
            RandomGenerator random,
            Consumer< Trajectory< S >> consumer,
            SimulationMonitor monitor,
            ModelDefinition< S > modelDefinition,
            SimulationState simulationState )
```

Creates a NetworkSimulationManager with the parameters given in input

Parameters

random	RandomGenerator used in the simulation
consumer	
monitor	TODO
modelDefinition	model definition that represent the Model used in the simulation
simulationState	state of the simulation that is being executed

5.43.3 Member Function Documentation

5.43.3.1 getNetworkSimulationManagerFactory()

```
static SimulationManagerFactory quasylab.sibilla.core.network.master.NetworkSimulationManager<
S extends State >.getNetworkSimulationManagerFactory (
            SimulationState simulationState )  [static]
```

5.43.3.2 join()

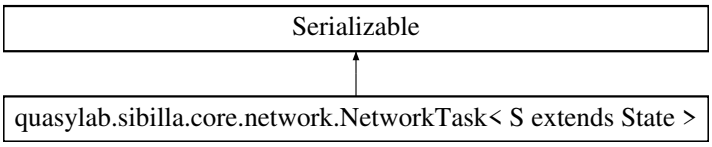
```
synchronized void quasylab.sibilla.core.network.master.NetworkSimulationManager< S extends
State >.join ( ) throws InterruptedException
```

5.43.3.3 startTasksHandling()

```
void quasylab.sibilla.core.network.master.NetworkSimulationManager< S extends State >.start↩
TasksHandling ( )  [protected]
```

5.44 quasylab.sibilla.core.network.NetworkTask< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.network.NetworkTask< S extends State >:



Public Member Functions

- NetworkTask (List< SimulationTask< S >> tasks)
- List< SimulationTask< S > > getTasks ()

5.44.1 Detailed Description

Class that stores a list of tasks sent through network.

Parameters

<S>	The quasylab.sibilla.core.past.State of the simulation model.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.44.2 Constructor & Destructor Documentation

5.44.2.1 NetworkTask()

```
quasylab.sibilla.core.network.NetworkTask< S extends State >.NetworkTask (
            List< SimulationTask< S >> tasks )
```

Creates a NetworkTask object from a list of tasks

Parameters

tasks	list of tasks to be executed by a slave server

5.44.3 Member Function Documentation

5.44.3.1 getTasks()

```
List<SimulationTask<S> > quasylab.sibilla.core.network.NetworkTask< S extends State >.get↩
Tasks ( )
```

Returns the list of tasks to be executed by a slave server

Returns

list of tasks to be executed by a slave server

5.45 quasylab.sibilla.core.network.util.NetworkUtils Class Reference

Static Public Member Functions

- static InetAddress getLocalAddress () throws SocketException
- static List< InetAddress > getBroadcastAddresses () throws SocketException

5.45.1 Detailed Description

Utility class used to manage and find the local ip of the host and its interfaces in an easy way

Author

Stelluti Francesco Pio

Zamponi Marco

5.45.2 Member Function Documentation

5.45.2.1 getBroadcastAddresses()

```
static List<InetAddress> quasylab.sibilla.core.network.util.NetworkUtils.getBroadcastAddresses
( ) throws SocketException  [static]
```

Returns a list of the broadcast addresses linked to each network interface on the host.

Returns

list of broadcast addresses linked to the network interfaces of the host

Exceptions

SocketException	if the host has no network interfaces configured or if an I/O exception happens

5.45.2.2 getLocalAddress()

```
static InetAddress quasylab.sibilla.core.network.util.NetworkUtils.getLocalAddress ( ) throws
SocketException  [static]
```

Returns the local IPV4 address of the machine.

Returns

local IPV4 address of the machine.

Exceptions

SocketException	if the host has no network interfaces configured or if an I/O exception happens

5.46 quasylab.sibilla.core.past.ds.TupleSpace.Node Class Reference

Public Member Functions

- Node ()
- Node get (Object v)
- LinkedList< Node > get (TemplateField f)

5.46.1 Constructor & Destructor Documentation

5.46.1.1 Node()

```
quasylab.sibilla.core.past.ds.TupleSpace.Node.Node ( )
```

5.46.2 Member Function Documentation

5.46.2.1 get() [1/2]

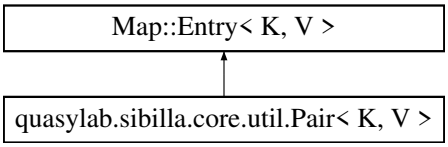
```
Node quasylab.sibilla.core.past.ds.TupleSpace.Node.get (
            Object v )
```

5.46.2.2 get() [2/2]

```
LinkedList<Node> quasylab.sibilla.core.past.ds.TupleSpace.Node.get (
            TemplateField f )
```

5.47 quasylab.sibilla.core.util.Pair< K, V > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.util.Pair< K, V >:



Public Member Functions

- Pair (Entry< K, V > entry)
- Pair (K key, V value)
- K getKey ()
- V getValue ()
- V setValue (V value)
- int hashCode ()
- boolean equals (Object obj)
- String toString ()
- Pair< K, V > apply (BiFunction< K, V, V > f)

Static Public Member Functions

- static< K, V, T > Pair< K, T > apply (Map.Entry< K, V > p, Function< V, T > f)

5.47.1 Detailed Description

Author

loreti

5.47.2 Constructor & Destructor Documentation

5.47.2.1 Pair() [1/2]

```
quasylab.sibilla.core.util.Pair< K, V >.Pair (
            Entry< K, V > entry )
```

5.47.2.2 Pair() [2/2]

```
quasylab.sibilla.core.util.Pair< K, V >.Pair (
            K key,
            V value )
```

5.47.3 Member Function Documentation

5.47.3.1 apply() [1/2]

```
Pair<K,V> quasylab.sibilla.core.util.Pair< K, V >.apply (
            BiFunction< K, V, V > f )
```

5.47.3.2 apply() [2/2]

```
static <K,V,T> Pair<K,T> quasylab.sibilla.core.util.Pair< K, V >.apply (
            Map.Entry< K, V > p,
            Function< V, T > f )  [static]
```

5.47.3.3 equals()

```
boolean quasylab.sibilla.core.util.Pair< K, V >.equals (
            Object obj )
```

5.47.3.4 getKey()

```
K quasylab.sibilla.core.util.Pair< K, V >.getKey ( )
```

5.47.3.5 getValue()

```
V quasylab.sibilla.core.util.Pair< K, V >.getValue ( )
```

5.47.3.6 hashCode()

```
int quasylab.sibilla.core.util.Pair< K, V >.hashCode ( )
```

5.47.3.7 setValue()

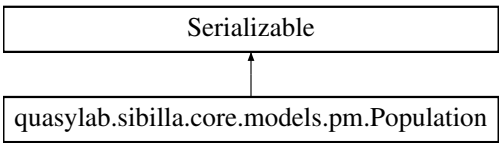
```
V quasylab.sibilla.core.util.Pair< K, V >.setValue (
            V value )
```

5.47.3.8 toString()

```
String quasylab.sibilla.core.util.Pair< K, V >.toString ( )
```

5.48 quasylab.sibilla.core.models.pm.Population Class Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.Population:



Public Member Functions

- Population (int index, int size)
- Population (int s)
- int getIndex ()
- int getSize ()

5.48.1 Constructor & Destructor Documentation

5.48.1.1 Population() [1/2]

```
quasylab.sibilla.core.models.pm.Population.Population (
            int index,
            int size )
```

Parameters

index	
size	

5.48.1.2 Population() [2/2]

```
quasylab.sibilla.core.models.pm.Population.Population (
            int s )
```

5.48.2 Member Function Documentation

5.48.2.1 getIndex()

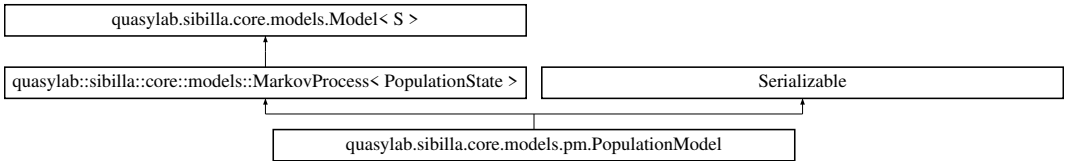
```
int quasylab.sibilla.core.models.pm.Population.getIndex ( )
```

5.48.2.2 getSize()

```
int quasylab.sibilla.core.models.pm.Population.getSize ( )
```

5.49 quasylab.sibilla.core.models.pm.PopulationModel Class Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.PopulationModel:



Public Member Functions

- PopulationModel ()
- PopulationModel (PopulationModelDefinition modelDefinition)
- WeightedStructure< StepFunction< PopulationState > > getTransitions (RandomGenerator r, double now, PopulationState state)
- void addRule (PopulationRule rule)
- void addRules (Collection< PopulationRule > rules)
- PopulationModelDefinition getModelDefinition ()

Static Public Member Functions

- static Map< String, Integer > createPopulation (String ... species)
- static PopulationState vectorOf (int ... species)

5.49.1 Detailed Description

This class implements a population model. This class is parametrised with respect to types S and and T. The former is the data type used to identify population species in the population vector. Parameter T identifies environment

Author

loreti

5.49.2 Constructor & Destructor Documentation

5.49.2.1 PopulationModel() [1/2]

```
quasylab.sibilla.core.models.pm.PopulationModel.PopulationModel ( )
```

5.49.2.2 PopulationModel() [2/2]

```
quasylab.sibilla.core.models.pm.PopulationModel.PopulationModel (
            PopulationModelDefinition modelDefinition )
```

5.49.3 Member Function Documentation

5.49.3.1 addRule()

```
void quasylab.sibilla.core.models.pm.PopulationModel.addRule (
            PopulationRule rule )
```

5.49.3.2 addRules()

```
void quasylab.sibilla.core.models.pm.PopulationModel.addRules (
            Collection< PopulationRule > rules )
```

5.49.3.3 createPopulation()

```
static Map<String,Integer> quasylab.sibilla.core.models.pm.PopulationModel.createPopulation (
            String ...  species )  [static]
```

5.49.3.4 getModelDefinition()

```
PopulationModelDefinition quasylab.sibilla.core.models.pm.PopulationModel.getModelDefinition (
)
```

5.49.3.5 getTransitions()

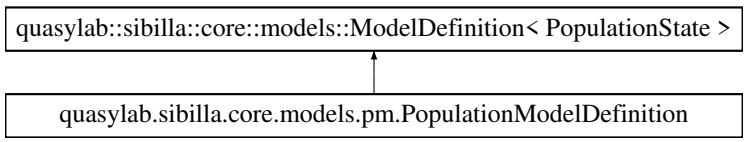
```
WeightedStructure<StepFunction<PopulationState> > quasylab.sibilla.core.models.pm.Population↩
Model.getTransitions (
            RandomGenerator r,
            double now,
            PopulationState state )
```

5.49.3.6 vectorOf()

```
static PopulationState quasylab.sibilla.core.models.pm.PopulationModel.vectorOf (
            int ...  species )  [static]
```

5.50 quasylab.sibilla.core.models.pm.PopulationModelDefinition Interface Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.PopulationModelDefinition:



Additional Inherited Members

5.51 quasylab.sibilla.core.models.pm.util.PopulationRegistry Class Reference

Public Member Functions

- PopulationRegistry ()
- void register (Object ... values)
- int indexOf (Object ... values)
- int size ()
- PopulationState createPopulationState (Function< Object[ ], Integer > population)

5.51.1 Detailed Description

Author

loreti

5.51.2 Constructor & Destructor Documentation

5.51.2.1 PopulationRegistry()

```
quasylab.sibilla.core.models.pm.util.PopulationRegistry.PopulationRegistry ( )
```

5.51.3 Member Function Documentation

5.51.3.1 createPopulationState()

```
PopulationState quasylab.sibilla.core.models.pm.util.PopulationRegistry.createPopulationState
(
            Function< Object[], Integer > population )
```

5.51.3.2 indexOf()

```
int quasylab.sibilla.core.models.pm.util.PopulationRegistry.indexOf (
            Object ... values )
```

5.51.3.3 register()

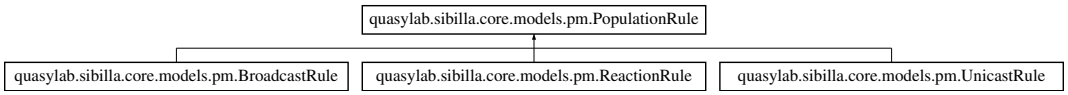
```
void quasylab.sibilla.core.models.pm.util.PopulationRegistry.register (
            Object ... values )
```

5.51.3.4 size()

```
int quasylab.sibilla.core.models.pm.util.PopulationRegistry.size ( )
```

5.52 quasylab.sibilla.core.models.pm.PopulationRule Interface Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.PopulationRule:



Public Member Functions

- PopulationTransition apply (RandomGenerator r, double now, PopulationState state)

5.52.1 Detailed Description

Author

loreti

5.52.2 Member Function Documentation

5.52.2.1 apply()

```
PopulationTransition quasylab.sibilla.core.models.pm.PopulationRule.apply (
            RandomGenerator r,
            double now,
            PopulationState state )
```

Parameters

r	
state	

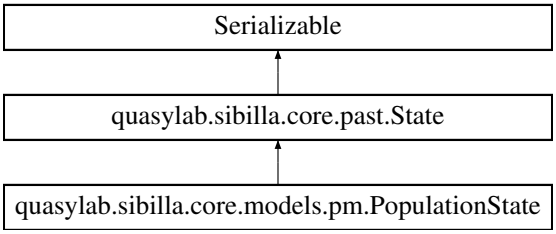
Returns

null if the rule cannot be applied.

Implemented in quasylab.sibilla.core.models.pm.UnicastRule, quasylab.sibilla.core.models.pm.ReactionRule, and quasylab.sibilla.core.models.pm.BroadcastRule.

5.53 quasylab.sibilla.core.models.pm.PopulationState Class Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.PopulationState:



Public Member Functions

- PopulationState (int size)
- PopulationState (int size, Population... species)
- PopulationState (int size, IntFunction< Integer > f)
- PopulationState (int[ ] state)
- double population ()
- double getOccupancy (int i)
- double getOccupancy (int ... idx)
- double getFraction (int idx)
- PopulationState apply (Update update)
- double min (Function< Integer, Double > f)
- double min (Predicate< Integer > p, Function< Integer, Double > f)
- double max (Function< Integer, Double > f)
- double max (Predicate< Integer > p, Function< Integer, Double > f)
- double average (Predicate< Integer > p, Function< Integer, Double > f)
- double average (Function< Integer, Double > f)
- int count (Set< Integer > species)
- int count (Predicate< Integer > p)
- String toString ()
- int size ()
- double fraction (int i)
- PopulationState copy ()

Static Public Member Functions

- static int[ ] fillState (int size, IntFunction< Integer > f)

5.53.1 Detailed Description

The instances of this class represent a generic population state having species of type `S`.

Author

loreti

5.53.2 Constructor & Destructor Documentation

5.53.2.1 PopulationState() [1/4]

```
quasylab.sibilla.core.models.pm.PopulationState.PopulationState (
            int size )
```

5.53.2.2 PopulationState() [2/4]

```
quasylab.sibilla.core.models.pm.PopulationState.PopulationState (
            int size,
            Population...  species )
```

5.53.2.3 PopulationState() [3/4]

```
quasylab.sibilla.core.models.pm.PopulationState.PopulationState (
            int size,
            IntFunction< Integer > f )
```

5.53.2.4 PopulationState() [4/4]

```
quasylab.sibilla.core.models.pm.PopulationState.PopulationState (
            int[] state )
```

5.53.3 Member Function Documentation

5.53.3.1 apply()

```
PopulationState quasylab.sibilla.core.models.pm.PopulationState.apply (
            Update update )
```

5.53.3.2 average() [1/2]

```
double quasylab.sibilla.core.models.pm.PopulationState.average (
            Function< Integer, Double > f )
```

5.53.3.3 average() [2/2]

```
double quasylab.sibilla.core.models.pm.PopulationState.average (
            Predicate< Integer > p,
            Function< Integer, Double > f )
```

5.53.3.4 copy()

```
PopulationState quasylab.sibilla.core.models.pm.PopulationState.copy ( )
```

5.53.3.5 count() [1/2]

```
int quasylab.sibilla.core.models.pm.PopulationState.count (
            Predicate< Integer > p )
```

5.53.3.6 count() [2/2]

```
int quasylab.sibilla.core.models.pm.PopulationState.count (
            Set< Integer > species )
```

5.53.3.7 fillState()

```
static int [] quasylab.sibilla.core.models.pm.PopulationState.fillState (
            int size,
            IntFunction< Integer > f )  [static]
```

5.53.3.8 fraction()

```
double quasylab.sibilla.core.models.pm.PopulationState.fraction (
            int i )
```

5.53.3.9 getFraction()

```
double quasylab.sibilla.core.models.pm.PopulationState.getFraction (
            int idx )
```

5.53.3.10 getOccupancy() [1/2]

```
double quasylab.sibilla.core.models.pm.PopulationState.getOccupancy (
            int ...  idx )
```

5.53.3.11 getOccupancy() [2/2]

```
double quasylab.sibilla.core.models.pm.PopulationState.getOccupancy (
            int i )
```

5.53.3.12 max() [1/2]

```
double quasylab.sibilla.core.models.pm.PopulationState.max (
            Function< Integer, Double > f )
```

5.53.3.13 max() [2/2]

```
double quasylab.sibilla.core.models.pm.PopulationState.max (
            Predicate< Integer > p,
            Function< Integer, Double > f )
```

5.53.3.14 min() [1/2]

```
double quasylab.sibilla.core.models.pm.PopulationState.min (
            Function< Integer, Double > f )
```

5.53.3.15 min() [2/2]

```
double quasylab.sibilla.core.models.pm.PopulationState.min (
            Predicate< Integer > p,
            Function< Integer, Double > f )
```

5.53.3.16 population()

```
double quasylab.sibilla.core.models.pm.PopulationState.population ( )
```

5.53.3.17 size()

```
int quasylab.sibilla.core.models.pm.PopulationState.size ( )
```

5.53.3.18 toString()

```
String quasylab.sibilla.core.models.pm.PopulationState.toString ( )
```

5.54 quasylab.sibilla.core.models.pm.PopulationTransition Class Reference

Public Member Functions

- PopulationTransition (String name, double rate, Function< RandomGenerator, Update > transitionDrift↩ Function)
- double getRate ()
- Update apply (RandomGenerator r)
- String getName ()

5.54.1 Detailed Description

Author

loreti

5.54.2 Constructor & Destructor Documentation

5.54.2.1 PopulationTransition()

```
quasylab.sibilla.core.models.pm.PopulationTransition.PopulationTransition (
            String name,
            double rate,
            Function< RandomGenerator, Update > transitionDriftFunction )
```

5.54.3 Member Function Documentation

5.54.3.1 apply()

```
Update quasylab.sibilla.core.models.pm.PopulationTransition.apply (
            RandomGenerator r )
```

5.54.3.2 getName()

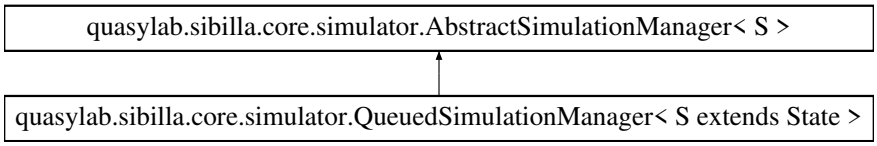
```
String quasylab.sibilla.core.models.pm.PopulationTransition.getName ( )
```

5.54.3.3 getRate()

```
double quasylab.sibilla.core.models.pm.PopulationTransition.getRate ( )
```

5.55 quasylab.sibilla.core.simulator.QueuedSimulationManager< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.QueuedSimulationManager< S extends State >:



Public Member Functions

- QueuedSimulationManager (RandomGenerator random, SimulationMonitor monitor, Consumer< Trajectory< S >> trajectoryConsumer)
- synchronized int pendingTasks ()

Protected Member Functions

- abstract void startTasksHandling ()
- synchronized void handleTask (SimulationTask< S > simulationTask)
- synchronized void rescheduleAll (Collection<? extends SimulationTask< S >> tasks)
- synchronized SimulationTask< S > nextTask ()
- synchronized SimulationTask< S > nextTask (boolean blocking) throws InterruptedException
- synchronized List< SimulationTask< S > > getTask (int n)
- synchronized List< SimulationTask< S > > getTask (int n, boolean blocking) throws InterruptedException
- synchronized boolean hasTasks ()
- int getRunningTasks ()

5.55.1 Detailed Description

A SimulationManager has the responsibility to coordinate simulation activities.

Author

Matteo Belenchia, Michele Loreti

5.55.2 Constructor & Destructor Documentation

5.55.2.1 QueuedSimulationManager()

```
quasylab.sibilla.core.simulator.QueuedSimulationManager< S extends State >.QueuedSimulationManager
(
            RandomGenerator random,
            SimulationMonitor monitor,
            Consumer< Trajectory< S >> trajectoryConsumer )
```

5.55.3 Member Function Documentation

5.55.3.1 getRunningTasks()

```
int quasylab.sibilla.core.simulator.QueuedSimulationManager< S extends State >.getRunningTasks
( )  [protected]
```

5.55.3.2 getTask() [1/2]

```
synchronized List<SimulationTask<S> > quasylab.sibilla.core.simulator.QueuedSimulationManager<
S extends State >.getTask (
            int n )  [protected]
```

Gets the next n tasks to execute

Parameters

n	number of tasks to be returned

Returns

list of the requested tasks

5.55.3.3 getTask() [2/2]

```
synchronized List<SimulationTask<S> > quasylab.sibilla.core.simulator.QueuedSimulationManager<
S extends State >.getTask (
            int n,
            boolean blocking ) throws InterruptedException  [protected]
```

- Gets the next n tasks to execute

Parameters

n	number of tasks to be returned
blocking	whether the operation is blocking or not

Returns

list of the requested tasks

Exceptions

InterruptedException	

5.55.3.4 handleTask()

```
synchronized void quasylab.sibilla.core.simulator.QueuedSimulationManager< S extends State
>.handleTask (
            SimulationTask< S > simulationTask )  [protected]
```

Add a simulationTask to the tasks to be executed

Parameters

simulationTask	tasks to be added

5.55.3.5 hasTasks()

```
synchronized boolean quasylab.sibilla.core.simulator.QueuedSimulationManager< S extends State
>.hasTasks ( )  [protected]
```

5.55.3.6 nextTask() [1/2]

```
synchronized SimulationTask<S> quasylab.sibilla.core.simulator.QueuedSimulationManager< S
extends State >.nextTask ( )  [protected]
```

5.55.3.7 nextTask() [2/2]

```
synchronized SimulationTask<S> quasylab.sibilla.core.simulator.QueuedSimulationManager< S
extends State >.nextTask (
            boolean blocking ) throws InterruptedException  [protected]
```

Gets the next task to be executed

Parameters

blocking	whether the operation is blocking or not

Returns

next task to be executed

Exceptions

InterruptedException	

5.55.3.8 pendingTasks()

```
synchronized int quasylab.sibilla.core.simulator.QueuedSimulationManager< S extends State
>.pendingTasks ( )
```

5.55.3.9 rescheduleAll()

```
synchronized void quasylab.sibilla.core.simulator.QueuedSimulationManager< S extends State
>.rescheduleAll (
            Collection<?  extends SimulationTask< S >> tasks )  [protected]
```

Reschedules all the tasks given in input

Parameters

tasks	tasks to reschedule

5.55.3.10 startTasksHandling()

```
abstract void quasylab.sibilla.core.simulator.QueuedSimulationManager< S extends State >.start↩
TasksHandling ( )  [abstract], [protected]
```

Starts the handling of the tasks to be executed to complete the simulation

5.56 quasylab.sibilla.core.past.RandomGeneratorRegistry Class Reference

Public Member Functions

- synchronized void register (RandomGenerator rg)
- synchronized void unregister ()
- synchronized RandomGenerator get ()

Static Public Member Functions

- static synchronized RandomGeneratorRegistry getInstance ()
- static< T > T uniform (T ... data)
- static< T > T uniformSelect (Collection< T > collection)
- static< T > T select (Collection< T > collection, Function< T, Double > weight)
- static< T > T weightedSelect (T[ ] data, double[ ] weights)
- static double rnd ()
- static double normal (double mean, double sd)

5.56.1 Detailed Description

Author

loreti

5.56.2 Member Function Documentation

5.56.2.1 get()

```
synchronized RandomGenerator quasylab.sibilla.core.past.RandomGeneratorRegistry.get ( )
```

5.56.2.2 getInstance()

```
static synchronized RandomGeneratorRegistry quasylab.sibilla.core.past.RandomGeneratorRegistry.↩
getInstance ( )  [static]
```

5.56.2.3 normal()

```
static double quasylab.sibilla.core.past.RandomGeneratorRegistry.normal (
            double mean,
            double sd )  [static]
```

5.56.2.4 register()

```
synchronized void quasylab.sibilla.core.past.RandomGeneratorRegistry.register (
            RandomGenerator rg )
```

5.56.2.5 rnd()

```
static double quasylab.sibilla.core.past.RandomGeneratorRegistry.rnd ( )  [static]
```

5.56.2.6 select()

```
static <T> T quasylab.sibilla.core.past.RandomGeneratorRegistry.select (
            Collection< T > collection,
            Function< T, Double > weight )  [static]
```

5.56.2.7 uniform()

```
static <T> T quasylab.sibilla.core.past.RandomGeneratorRegistry.uniform (
            T ...  data )  [static]
```

5.56.2.8 uniformSelect()

```
static <T> T quasylab.sibilla.core.past.RandomGeneratorRegistry.uniformSelect (
            Collection< T > collection )  [static]
```

5.56.2.9 unregister()

```
synchronized void quasylab.sibilla.core.past.RandomGeneratorRegistry.unregister ( )
```

5.56.2.10 weightedSelect()

```
static <T> T quasylab.sibilla.core.past.RandomGeneratorRegistry.weightedSelect (
            T[] data,
            double[] weights )  [static]
```

5.57 quasylab.sibilla.core.markov.RateFunction< S > Interface Template Reference

Public Member Functions

- double valueOf (S s)

5.57.1 Detailed Description

Author

loreti

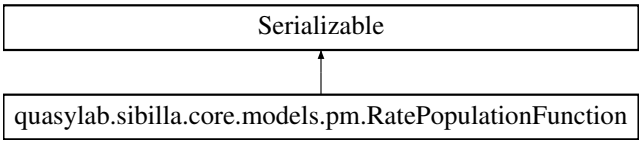
5.57.2 Member Function Documentation

5.57.2.1 valueOf()

```
double quasylab.sibilla.core.markov.RateFunction< S >.valueOf (
            S s )
```

5.58 quasylab.sibilla.core.models.pm.RatePopulationFunction Interface Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.RatePopulationFunction:



Public Member Functions

- double apply (double now, PopulationState state)

5.58.1 Detailed Description

Author

loreti

5.58.2 Member Function Documentation

5.58.2.1 apply()

```
double quasylab.sibilla.core.models.pm.RatePopulationFunction.apply (
            double now,
            PopulationState state )
```

5.59 quasylab.sibilla.core.simulator.tests.pm.RBModel Class Reference

Public Member Functions

- RBModel (int k, double lambda_s, double lambda_c, double change_prob, double stay_prob)
- void run (int scale, int iterations, double deadline, int samplings, String outputDir) throws FileNotFound↩ Exception, InterruptedException

Static Public Member Functions

- static void main (String[ ] argv) throws InterruptedException, FileNotFoundException

Static Public Attributes

- static final int SIZE = 100
- static final int R_INDEX = 0
- static final int B_INDEX = 1
- static final int RT_INDEX = 2
- static final int BT_INDEX = 3
- static final double SPREAD_RATE = 0.1
- static final double CHANGE_RATE = 1.0
- static final double K = 10

5.59.1 Detailed Description

Author

loreti

5.59.2 Constructor & Destructor Documentation

5.59.2.1 RBModel()

```
quasylab.sibilla.core.simulator.tests.pm.RBModel.RBModel (
            int k,
            double lambda_s,
            double lambda_c,
            double change_prob,
            double stay_prob )
```

5.59.3 Member Function Documentation

5.59.3.1 main()

```
static void quasylab.sibilla.core.simulator.tests.pm.RBModel.main (
            String[] argv ) throws InterruptedException, FileNotFoundException  [static]
```

5.59.3.2 run()

```
void quasylab.sibilla.core.simulator.tests.pm.RBModel.run (
            int scale,
            int iterations,
            double deadline,
            int samplings,
            String outputDir ) throws FileNotFoundException, InterruptedException
```

5.59.4 Member Data Documentation

5.59.4.1 B_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.RBModel.B_INDEX = 1  [static]
```

5.59.4.2 BT_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.RBModel.BT_INDEX = 3  [static]
```

5.59.4.3 CHANGE_RATE

```
final double quasylab.sibilla.core.simulator.tests.pm.RBModel.CHANGE_RATE = 1.0  [static]
```

5.59.4.4 K

```
final double quasylab.sibilla.core.simulator.tests.pm.RBModel.K = 10  [static]
```

5.59.4.5 R_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.RBModel.R_INDEX = 0  [static]
```

5.59.4.6 RT_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.RBModel.RT_INDEX = 2  [static]
```

5.59.4.7 SIZE

```
final int quasylab.sibilla.core.simulator.tests.pm.RBModel.SIZE = 100  [static]
```

5.59.4.8 SPREAD_RATE

```
final double quasylab.sibilla.core.simulator.tests.pm.RBModel.SPREAD_RATE = 0.1  [static]
```

5.60 quasylab.sibilla.core.simulator.tests.pm.RBModelFactory Class Reference

Static Public Attributes

- static final int SIZE = 100
- static final int R_INDEX = 0
- static final int B_INDEX = 1
- static final int RT_INDEX = 2
- static final int BT_INDEX = 3
- static final double SPREAD_RATE = 0.1
- static final double CHANGE_RATE = 1.0
- static final double K = 10

5.60.1 Detailed Description

Author

loreti

5.60.2 Member Data Documentation

5.60.2.1 B_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.RBModelFactory.B_INDEX = 1  [static]
```

5.60.2.2 BT_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.RBModelFactory.BT_INDEX = 3  [static]
```

5.60.2.3 CHANGE_RATE

```
final double quasylab.sibilla.core.simulator.tests.pm.RBModelFactory.CHANGE_RATE = 1.0  [static]
```

5.60.2.4 K

```
final double quasylab.sibilla.core.simulator.tests.pm.RBModelFactory.K = 10  [static]
```

5.60.2.5 R_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.RBModelFactory.R_INDEX = 0  [static]
```

5.60.2.6 RT_INDEX

```
final int quasylab.sibilla.core.simulator.tests.pm.RBModelFactory.RT_INDEX = 2  [static]
```

5.60.2.7 SIZE

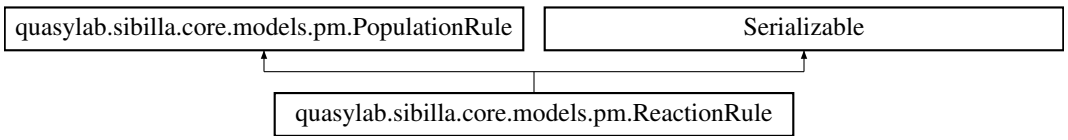
```
final int quasylab.sibilla.core.simulator.tests.pm.RBModelFactory.SIZE = 100  [static]
```

5.60.2.8 SPREAD_RATE

```
final double quasylab.sibilla.core.simulator.tests.pm.RBModelFactory.SPREAD_RATE = 0.1  [static]
```

5.61 quasylab.sibilla.core.models.pm.ReactionRule Class Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.ReactionRule:



Public Member Functions

- ReactionRule (String name, Population[] reactants, Population[] products, RatePopulationFunction rate↩ Function)
- PopulationTransition apply (RandomGenerator r, double now, PopulationState state)

5.61.1 Detailed Description

Author

loreti

5.61.2 Constructor & Destructor Documentation

5.61.2.1 ReactionRule()

```
quasylab.sibilla.core.models.pm.ReactionRule.ReactionRule (
            String name,
            Population[] reactants,
            Population[] products,
            RatePopulationFunction rateFunction )
```

Parameters

reactants	
products	
rateFunction	

5.61.3 Member Function Documentation

5.61.3.1 apply()

```
PopulationTransition quasylab.sibilla.core.models.pm.ReactionRule.apply (
            RandomGenerator r,
            double now,
            PopulationState state )
```

Parameters

r	
state	

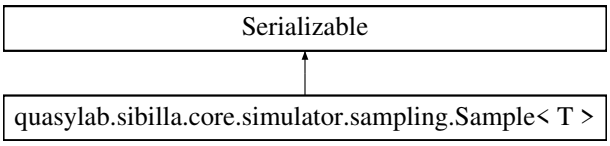
Returns

null if the rule cannot be applied.

Implements quasylab.sibilla.core.models.pm.PopulationRule.

5.62 quasylab.sibilla.core.simulator.sampling.Sample< T > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.sampling.Sample< T >:



Public Member Functions

- Sample (double time, T value)
- int hashCode ()
- boolean equals (Object obj)
- String toString ()
- double getTime ()
- T getValue ()

5.62.1 Detailed Description

Author

loreti

5.62.2 Constructor & Destructor Documentation

5.62.2.1 Sample()

```
quasylab.sibilla.core.simulator.sampling.Sample< T >.Sample (
            double time,
            T value )
```

5.62.3 Member Function Documentation

5.62.3.1 equals()

```
boolean quasylab.sibilla.core.simulator.sampling.Sample< T >.equals (
            Object obj )
```

5.62.3.2 getTime()

```
double quasylab.sibilla.core.simulator.sampling.Sample< T >.getTime ( )
```

5.62.3.3 getValue()

```
T quasylab.sibilla.core.simulator.sampling.Sample< T >.getValue ( )
```

5.62.3.4 hashCode()

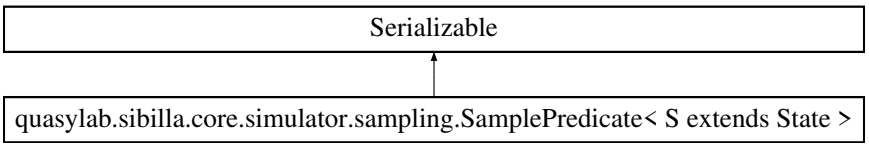
```
int quasylab.sibilla.core.simulator.sampling.Sample< T >.hashCode ( )
```

5.62.3.5 toString()

```
String quasylab.sibilla.core.simulator.sampling.Sample< T >.toString ( )
```

5.63 quasylab.sibilla.core.simulator.sampling.SamplePredicate< S extends State > Interface Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.sampling.SamplePredicate< S extends State >:



Public Member Functions

- static< S extends State > SamplePredicate< S > samplePredicate (StatePredicate< S > condition)
- static< S extends State > SamplePredicate< S > samplePredicate (double deadline, StatePredicate<? super S > condition)
- static< S extends State > SamplePredicate< S > timeDeadlinePredicate (double d)
- boolean test (double time, S state)

5.63.1 Detailed Description

This functional interface is used to declare the stopping predicate of a simulation.

Author

loreti

5.63.2 Member Function Documentation

5.63.2.1 samplePredicate() [1/2]

```
static<S extends State> SamplePredicate<S> quasylab.sibilla.core.simulator.sampling.SamplePredicate<
S extends State >.samplePredicate (
            double deadline,
            StatePredicate<? super S > condition )
```

5.63.2.2 samplePredicate() [2/2]

```
static<S extends State> SamplePredicate<S> quasylab.sibilla.core.simulator.sampling.SamplePredicate<
S extends State >.samplePredicate (
            StatePredicate< S > condition )
```

5.63.2.3 test()

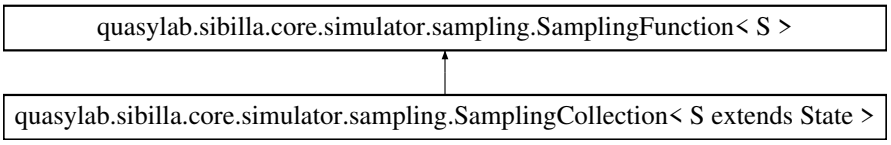
```
boolean quasylab.sibilla.core.simulator.sampling.SamplePredicate< S extends State >.test (
            double time,
            S state )
```

5.63.2.4 timeDeadlinePredicate()

```
static<S extends State> SamplePredicate<S> quasylab.sibilla.core.simulator.sampling.SamplePredicate<
S extends State >.timeDeadlinePredicate (
            double d )
```

5.64 quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >:



Public Member Functions

- SamplingCollection ()
- SamplingCollection (SamplingFunction< S >... functions)
- SamplingCollection (Collection<? extends SamplingFunction< S >> functions)
- void sample (double time, S context)
- void end (double time)
- void start ()
- void printTimeSeries (Function< String, String > nameFunction, char separator, double significance) throws FileNotFoundException
- int size ()
- SamplingFunction< S > get (int i)
- LinkedList< SimulationTimeSeries > getSimulationTimeSeries (int replications)
- void add (StatisticSampling< S > f)

5.64.1 Detailed Description

Author

loreti

5.64.2 Constructor & Destructor Documentation

5.64.2.1 SamplingCollection() [1/3]

```
quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >.SamplingCollection
( )
```

5.64.2.2 SamplingCollection() [2/3]

```
quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >.SamplingCollection
(
            SamplingFunction< S >...  functions )
```

5.64.2.3 SamplingCollection() [3/3]

```
quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >.SamplingCollection
(
            Collection<?  extends SamplingFunction< S >> functions )
```

5.64.3 Member Function Documentation

5.64.3.1 add()

```
void quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >.add (
            StatisticSampling< S > f )
```

5.64.3.2 end()

```
void quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >.end (
            double time )
```

5.64.3.3 get()

```
SamplingFunction<S> quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends
State >.get (
            int i )
```

5.64.3.4 getSimulationTimeSeries()

```
LinkedList<SimulationTimeSeries> quasylab.sibilla.core.simulator.sampling.SamplingCollection<
S extends State >.getSimulationTimeSeries (
            int replications )
```

5.64.3.5 printTimeSeries()

```
void quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >.print↩
TimeSeries (
            Function< String, String > nameFunction,
            char separator,
            double significance ) throws FileNotFoundException
```

5.64.3.6 sample()

```
void quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >.sample (
            double time,
            S context )
```

5.64.3.7 size()

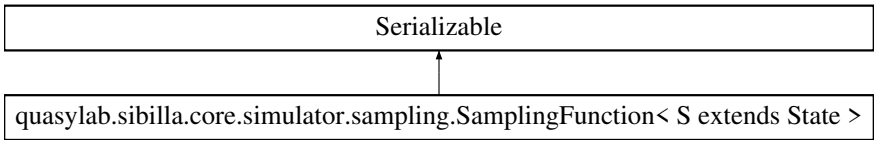
```
int quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >.size ( )
```

5.64.3.8 start()

```
void quasylab.sibilla.core.simulator.sampling.SamplingCollection< S extends State >.start ( )
```

5.65 quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State > Interface Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >:



Public Member Functions

- void sample (double time, S context)
- void end (double time)
- void start ()
- default void printTimeSeries (Function< String, String > nameFunction) throws FileNotFoundException
- default void printTimeSeries (Function< String, String > nameFunction, char separator) throws FileNotFoundException
- void printTimeSeries (Function< String, String > nameFunction, char separator, double significance) throws FileNotFoundException
- default void printTimeSeries (String dir, String prefix, String postfix, char separator, double significance) throws FileNotFoundException
- default void printTimeSeries (String dir, String prefix, String postfix, char separator) throws FileNotFoundException
- default void printTimeSeries (String dir, String prefix, String postfix) throws FileNotFoundException
- List< SimulationTimeSeries > getSimulationTimeSeries (int replications)

5.65.1 Detailed Description

Author

loreti

5.65.2 Member Function Documentation

5.65.2.1 end()

```
void quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >.end (
            double time )
```

5.65.2.2 getSimulationTimeSeries()

```
List<SimulationTimeSeries> quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends
State >.getSimulationTimeSeries (
            int replications )
```

5.65.2.3 printTimeSeries() [1/6]

```
default void quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >.print↩
TimeSeries (
            Function< String, String > nameFunction ) throws FileNotFoundException
```

5.65.2.4 printTimeSeries() [2/6]

```
default void quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >.print↩
TimeSeries (
            Function< String, String > nameFunction,
            char separator ) throws FileNotFoundException
```

5.65.2.5 printTimeSeries() [3/6]

```
void quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >.printTime↩
Series (
            Function< String, String > nameFunction,
            char separator,
            double significance ) throws FileNotFoundException
```

5.65.2.6 printTimeSeries() [4/6]

```
default void quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >.print↩
TimeSeries (
            String dir,
            String prefix,
            String postfix ) throws FileNotFoundException
```

5.65.2.7 printTimeSeries() [5/6]

```
default void quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >.print↩
TimeSeries (
            String dir,
            String prefix,
            String postfix,
            char separator ) throws FileNotFoundException
```

5.65.2.8 printTimeSeries() [6/6]

```
default void quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >.print↩
TimeSeries (
            String dir,
            String prefix,
            String postfix,
            char separator,
            double significance ) throws FileNotFoundException
```

5.65.2.9 sample()

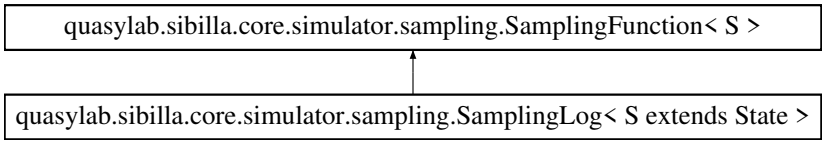
```
void quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >.sample (
            double time,
            S context )
```

5.65.2.10 start()

```
void quasylab.sibilla.core.simulator.sampling.SamplingFunction< S extends State >.start ( )
```

5.66 quasylab.sibilla.core.simulator.sampling.SamplingLog< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.sampling.SamplingLog< S extends State >:



Public Member Functions

- SamplingLog (double dt)
- void sample (double time, S context)
- void end (double time)
- void start ()
- void printTimeSeries (Function< String, String > nameFunction, char separator, double significance)
- LinkedList< SimulationTimeSeries > getSimulationTimeSeries (int replications)

5.66.1 Detailed Description

Author

loreti

5.66.2 Constructor & Destructor Documentation

5.66.2.1 SamplingLog()

```
quasylab.sibilla.core.simulator.sampling.SamplingLog< S extends State >.SamplingLog (
            double dt )
```

5.66.3 Member Function Documentation

5.66.3.1 end()

```
void quasylab.sibilla.core.simulator.sampling.SamplingLog< S extends State >.end (
            double time )
```

5.66.3.2 getSimulationTimeSeries()

```
LinkedList<SimulationTimeSeries> quasylab.sibilla.core.simulator.sampling.SamplingLog< S
extends State >.getSimulationTimeSeries (
            int replications )
```

5.66.3.3 printTimeSeries()

```
void quasylab.sibilla.core.simulator.sampling.SamplingLog< S extends State >.printTimeSeries (
            Function< String, String > nameFunction,
            char separator,
            double significance )
```

5.66.3.4 sample()

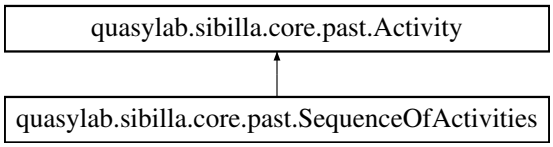
```
void quasylab.sibilla.core.simulator.sampling.SamplingLog< S extends State >.sample (
            double time,
            S context )
```

5.66.3.5 start()

```
void quasylab.sibilla.core.simulator.sampling.SamplingLog< S extends State >.start ( )
```

5.67 quasylab.sibilla.core.past.SequenceOfActivities Class Reference

Inheritance diagram for quasylab.sibilla.core.past.SequenceOfActivities:



Public Member Functions

- String toString ()
- SequenceOfActivities (Activity... activities)
- boolean execute (RandomGenerator r, double now, double dt)
- String getName ()

5.67.1 Detailed Description

Author

loreti

5.67.2 Constructor & Destructor Documentation

5.67.2.1 SequenceOfActivities()

```
quasylab.sibilla.core.past.SequenceOfActivities.SequenceOfActivities (
            Activity...  activities )
```

5.67.3 Member Function Documentation

5.67.3.1 execute()

```
boolean quasylab.sibilla.core.past.SequenceOfActivities.execute (
            RandomGenerator r,
            double now,
            double dt )
```

Implements quasylab.sibilla.core.past.Activity.

5.67.3.2 getName()

```
String quasylab.sibilla.core.past.SequenceOfActivities.getName ( )
```

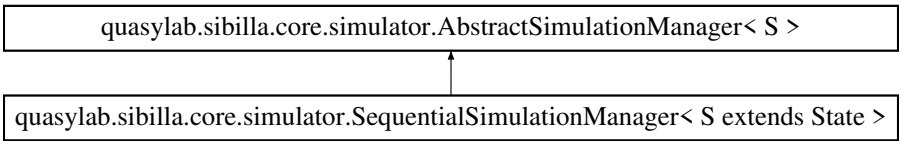
Implements quasylab.sibilla.core.past.Activity.

5.67.3.3 toString()

```
String quasylab.sibilla.core.past.SequenceOfActivities.toString ( )
```

5.68 quasylab.sibilla.core.simulator.SequentialSimulationManager< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.SequentialSimulationManager< S extends State >:



Public Member Functions

- SequentialSimulationManager (RandomGenerator random, SimulationMonitor monitor, ModelDefinition< S > definitions, Consumer< Trajectory< S >> trajectoryConsumer)
- synchronized int pendingTasks ()
- synchronized void join ()

Protected Member Functions

- synchronized void handleTask (SimulationTask< S > simulationTask)

5.68.1 Detailed Description

Author

belenchia

5.68.2 Constructor & Destructor Documentation

5.68.2.1 SequentialSimulationManager()

```
quasylab.sibilla.core.simulator.SequentialSimulationManager< S extends State >.SequentialSimulationManager
(
            RandomGenerator random,
            SimulationMonitor monitor,
            ModelDefinition< S > definitions,
            Consumer< Trajectory< S >> trajectoryConsumer )
```

5.68.3 Member Function Documentation

5.68.3.1 handleTask()

```
synchronized void quasylab.sibilla.core.simulator.SequentialSimulationManager< S extends State
>.handleTask (
            SimulationTask< S > simulationTask )  [protected]
```

5.68.3.2 join()

```
synchronized void quasylab.sibilla.core.simulator.SequentialSimulationManager< S extends State
>.join ( )
```

5.68.3.3 pendingTasks()

```
synchronized int quasylab.sibilla.core.simulator.SequentialSimulationManager< S extends State
>.pendingTasks ( )
```

5.69 quasylab.sibilla.core.network.serialization.Serializer Class Reference

Static Public Member Functions

- static byte[ ] serialize (Serializable toSerialize)
- static Serializable deserialize (byte[ ] toDeserialize)

5.69.1 Detailed Description

Utility class used to serialize and deserialize data. The class operations are based upon the Apache's Serialization↩ Utils suite.

Author

Stelluti Francesco Pio

Zamponi Marco

5.69.2 Member Function Documentation

5.69.2.1 deserialize()

```
static Serializable quasylab.sibilla.core.network.serialization.Serializer.deserialize (
            byte[] toDeserialize )  [static]
```

Deserializes a byte array.

Parameters

toDeserialize	byte array to be deserialized

Returns

deserialized Serializable instance

5.69.2.2 serialize()

```
static byte [] quasylab.sibilla.core.network.serialization.Serializer.serialize (
            Serializable toSerialize )  [static]
```

Serializes a Serializable instance.

Parameters

toSerialize	instance to be compressed

Returns

serialized byte array

5.70 quasylab.sibilla.core.util.SibillaMessages Class Reference

Static Public Member Functions

- static String createdTimeStepWithNonPositiveTime (double time)
- static String aPositiveValueIsExpected (double value)
- static String wrongNumberOfParameters (int expected, int actual)

Static Public Attributes

- static final String ILLEGAL_TIME_IN_TIMESTEP = "A time step must be a value greater than 0 (%g is used)."
- static final String A_POSITIVE_VALUE_IS_EXPECTED = "A value greater than 0 is expected (%g is used)."

5.70.1 Detailed Description

Utility class used to build error and info messages.

5.70.2 Member Function Documentation

5.70.2.1 aPositiveValueIsExpected()

```
static String quasylab.sibilla.core.util.SibillaMessages.aPositiveValueIsExpected (
            double value )  [static]
```

A value greater than 0 is expexted.

Parameters

value	used value.

Returns

error message.

5.70.2.2 createdTimeStepWithNonPositiveTime()

```
static String quasylab.sibilla.core.util.SibillaMessages.createdTimeStepWithNonPositiveTime (
            double time )  [static]
```

A time step must be a value greater than 0.

Parameters

time	used time.

Returns

error message.

5.70.2.3 wrongNumberOfParameters()

```
static String quasylab.sibilla.core.util.SibillaMessages.wrongNumberOfParameters (
            int expected,
            int actual )  [static]
```

5.70.3 Member Data Documentation

5.70.3.1 A_POSITIVE_VALUE_IS_EXPECTED

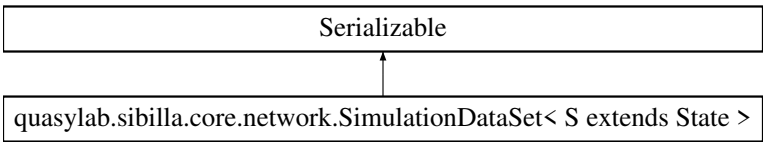
```
final String quasylab.sibilla.core.util.SibillaMessages.A_POSITIVE_VALUE_IS_EXPECTED = "A
value greater than 0 is expected (%g is used)."  [static]
```

5.70.3.2 ILLEGAL_TIME_IN_TIMESTEP

```
final String quasylab.sibilla.core.util.SibillaMessages.ILLEGAL_TIME_IN_TIMESTEP = "A time
step must be a value greater than 0 (%g is used)."  [static]
```

5.71 quasylab.sibilla.core.network.SimulationDataSet< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.network.SimulationDataSet< S extends State >:



Public Member Functions

- SimulationDataSet (RandomGenerator random, ModelDefinition< S > modelDefinition, Model< S > model, S initialState, SamplingFunction< S > sampling_function, int replica, double deadline)
- int hashCode ()
- boolean equals (Object obj)
- RandomGenerator getRandomGenerator ()
- ModelDefinition< S > getModelDefinition ()
- Model< S > getModel ()
- S getModelInitialState ()
- SamplingFunction< S > getModelSamplingFunction ()
- int getReplica ()
- double getDeadline ()
- String toString ()

5.71.1 Detailed Description

Class that stores info about the simulation that is executed by slaves.

Parameters

<*S*>	The quasylab.sibilla.core.past.State of the simulation model.

Author

Stelluti Francesco Pio

Zamponi Marco

5.71.2 Constructor & Destructor Documentation

5.71.2.1 SimulationDataSet()

```
quasylab.sibilla.core.network.SimulationDataSet< S extends State >.SimulationDataSet (
            RandomGenerator random,
```

```
ModelDefinition< S > modelDefinition,
Model< S > model,
S initialState,
SamplingFunction< S > sampling_function,
int replica,
double deadline )
```

Creates a SimulationDataSet object with the parameters given in input.

Parameters

random	RandomGenerator used by the simulation
modelDefinition	quasylab.sibilla.core.models.ModelDefinition that represent the Model used in the simulation
model	quasylab.sibilla.core.models.Model used in the simulation
initialState	Initial state of the model
sampling_function	quasylab.sibilla.core.simulator.sampling.SamplingFunction used to sample the model
replica	Number of times the simulation is executed
deadline	The deadline of the simulation

5.71.3 Member Function Documentation

5.71.3.1 equals()

```
boolean quasylab.sibilla.core.network.SimulationDataSet< S extends State >.equals (
            Object obj )
```

5.71.3.2 getDeadline()

```
double quasylab.sibilla.core.network.SimulationDataSet< S extends State >.getDeadline ( )
```

Returns the deadline of the simulation.

Returns

deadline of the simulation

5.71.3.3 getModel()

```
Model<S> quasylab.sibilla.core.network.SimulationDataSet< S extends State >.getModel ( )
```

quasylab.sibilla.core.models.Model used in the simulation.

Returns

Model used in the simulation

5.71.3.4 getModelDefinition()

```
ModelDefinition<S> quasylab.sibilla.core.network.SimulationDataSet< S extends State >.get↩
ModelDefinition ( )
```

Returns the quasylab.sibilla.core.models.ModelDefinition that represent the Model used in the simulation.

Returns

ModelDefinition that represent the Model used in the simulation

5.71.3.5 getModelInitialState()

```
S quasylab.sibilla.core.network.SimulationDataSet< S extends State >.getModelInitialState ( )
```

Returns the initial state of the model.

Returns

initial state of the model

5.71.3.6 getModelSamplingFunction()

```
SamplingFunction<S> quasylab.sibilla.core.network.SimulationDataSet< S extends State >.get↩
ModelSamplingFunction ( )
```

Returns the quasylab.sibilla.core.simulator.sampling.SamplingFunction used to sample the model.

Returns

SamplingFunction used to sample the model

5.71.3.7 getRandomGenerator()

```
RandomGenerator quasylab.sibilla.core.network.SimulationDataSet< S extends State >.getRandom↩
Generator ( )
```

Returns the RandomGenerator used in the simulation.

Returns

RandomGenerator used in the simulation

5.71.3.8 getReplica()

```
int quasylab.sibilla.core.network.SimulationDataSet< S extends State >.getReplica ( )
```

Return the number of times the simulation is executed.

Returns

number of times the simulation is executed

5.71.3.9 hashCode()

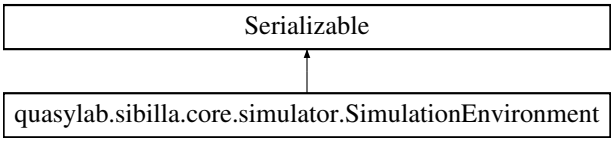
```
int quasylab.sibilla.core.network.SimulationDataSet< S extends State >.hashCode ( )
```

5.71.3.10 toString()

```
String quasylab.sibilla.core.network.SimulationDataSet< S extends State >.toString ( )
```

5.72 quasylab.sibilla.core.simulator.SimulationEnvironment Class Reference

Inheritance diagram for quasylab.sibilla.core.simulator.SimulationEnvironment:



Public Member Functions

- SimulationEnvironment ()
- SimulationEnvironment (SimulationManagerFactory simulationManagerFactory)

Static Public Attributes

- static final SimulationManagerFactory DEFAULT_FACTORY = SequentialSimulationManager::new
- static boolean silent = true

5.72.1 Detailed Description

An object responsible for managing simulations. When a new request is received, it is delegated to a SimulationManager that is built via SimulationManagerFactory.

5.72.2 Constructor & Destructor Documentation

5.72.2.1 SimulationEnvironment() [1/2]

```
quasylab.sibilla.core.simulator.SimulationEnvironment.SimulationEnvironment ( )
```

Creates a new simulation environment with default simulation factory. The latter is a multithreaded based simulation factory.

5.72.2.2 SimulationEnvironment() [2/2]

```
quasylab.sibilla.core.simulator.SimulationEnvironment.SimulationEnvironment (
            SimulationManagerFactory simulationManagerFactory )
```

Creates a new simulation environment given a SimulationManagerFactory. The latter is used to instantiate the QueuedSimulationManager used to handle the specific simulation.

Parameters

simulationManagerFactory	

5.72.3 Member Data Documentation

5.72.3.1 DEFAULT_FACTORY

```
final SimulationManagerFactory quasylab.sibilla.core.simulator.SimulationEnvironment.DEFAULT↩
_FACTORY = SequentialSimulationManager::new  [static]
```

Default simulation manager factory.

5.72.3.2 silent

```
boolean quasylab.sibilla.core.simulator.SimulationEnvironment.silent = true  [static]
```

5.73 quasylab.sibilla.core.simulator.SimulationManager< S extends State > Interface Template Reference

Public Member Functions

- void simulate (SimulationUnit< S > unit)
- int pendingTasks ()
- void join () throws InterruptedException
- void shutdown () throws InterruptedException
- boolean isRunning ()

5.73.1 Detailed Description

A simulation manager has the responsibility to execute a number of simulation units.

5.73.2 Member Function Documentation

5.73.2.1 isRunning()

```
boolean quasylab.sibilla.core.simulator.SimulationManager< S extends State >.isRunning ( )
```

5.73.2.2 join()

```
void quasylab.sibilla.core.simulator.SimulationManager< S extends State >.join ( ) throws
InterruptedException
```

Waits until all the pending tasks are terminated.

Exceptions

InterruptedException	if current thread is interrupted while its waiting for ending of simulation.

5.73.2.3 pendingTasks()

```
int quasylab.sibilla.core.simulator.SimulationManager< S extends State >.pendingTasks ( )
```

Returns the number of simulation tasks that are currently executed and are not yet terminated.

Returns

the number of simulation tasks that are currently executed and are not yet terminated.

5.73.2.4 shutdown()

```
void quasylab.sibilla.core.simulator.SimulationManager< S extends State >.shutdown ( ) throws
InterruptedException
```

5.73.2.5 simulate()

```
void quasylab.sibilla.core.simulator.SimulationManager< S extends State >.simulate (
            SimulationUnit< S > unit )
```

Schedules the execution of a given SimulationUnit.

Parameters

unit	simulation unit to execute.

5.74 quasylab.sibilla.core.simulator.SimulationManagerFactory Interface Reference

Public Member Functions

- < S extends State > SimulationManager< S > getSimulationManager (RandomGenerator random, SimulationMonitor monitor, ModelDefinition< S > modelDefinition, Consumer< Trajectory< S >> consumer)

5.74.1 Detailed Description

Author

loreti

5.74.2 Member Function Documentation

5.74.2.1 getSimulationManager()

```
<S extends State> SimulationManager<S> quasylab.sibilla.core.simulator.SimulationManager↩
Factory.getSimulationManager (
            RandomGenerator random,
            SimulationMonitor monitor,
            ModelDefinition< S > modelDefinition,
            Consumer< Trajectory< S >> consumer )
```

5.75 quasylab.sibilla.core.simulator.SimulationMonitor Interface Reference

Public Member Functions

- void startIteration (int i)
- void endIteration (int i)
- void endSimulation ()
- boolean isCancelled ()
- default void update (double time)
- void registerPropertyChangeListener (PropertyChangeListener l)

Public Attributes

- String CANCELLED = "CANCELLED"

5.75.1 Detailed Description

Author

loreti

5.75.2 Member Function Documentation

5.75.2.1 endIteration()

```
void quasylab.sibilla.core.simulator.SimulationMonitor.endIteration (
            int i )
```

5.75.2.2 endSimulation()

```
void quasylab.sibilla.core.simulator.SimulationMonitor.endSimulation ( )
```

5.75.2.3 isCancelled()

```
boolean quasylab.sibilla.core.simulator.SimulationMonitor.isCancelled ( )
```

5.75.2.4 registerPropertyChangeListener()

```
void quasylab.sibilla.core.simulator.SimulationMonitor.registerPropertyChangeListener (
            PropertyChangeListener l )
```

5.75.2.5 startIteration()

```
void quasylab.sibilla.core.simulator.SimulationMonitor.startIteration (
            int i )
```

5.75.2.6 update()

```
default void quasylab.sibilla.core.simulator.SimulationMonitor.update (
            double time )
```

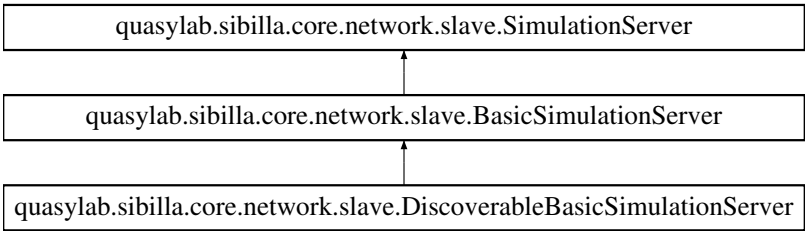
5.75.3 Member Data Documentation

5.75.3.1 CANCELLED

```
String quasylab.sibilla.core.simulator.SimulationMonitor.CANCELLED = "CANCELLED"
```

5.76 quasylab.sibilla.core.network.slave.SimulationServer Interface Reference

Inheritance diagram for quasylab.sibilla.core.network.slave.SimulationServer:



Public Member Functions

- void start (int port) throws IOException

5.76.1 Detailed Description

Interface for slave servers that execute simulations

Author

Belenchia Matteo
Stelluti Francesco Pio
Zamponi Marco

5.76.2 Member Function Documentation

5.76.2.1 start()

```
void quasylab.sibilla.core.network.slave.SimulationServer.start (
            int port ) throws IOException
```

Creates and starts the slave server on the given port.

Parameters

port	port used by the slave server to manage the incoming requests from the master servers

Exceptions

IOException	when problems arise in network interfaces usage

Implemented in quasylab.sibilla.core.network.slave.BasicSimulationServer.

5.77 quasylab.sibilla.core.past.SimulationSession Interface Reference

Public Member Functions

- int getSessionId ()
- boolean isRunning ()
- void shutdown () throws InterruptedException
- void join () throws InterruptedException
- int computedTrajectories ()
- double averageExecutionTime ()
- SimulationTask<?> nextTask ()
- List< SimulationTask<?> > getTask (int n)

5.77.1 Detailed Description

A

Author

loreti

5.77.2 Member Function Documentation

5.77.2.1 averageExecutionTime()

```
double quasylab.sibilla.core.past.SimulationSession.averageExecutionTime ( )
```

5.77.2.2 computedTrajectories()

```
int quasylab.sibilla.core.past.SimulationSession.computedTrajectories ( )
```

5.77.2.3 getSessionId()

```
int quasylab.sibilla.core.past.SimulationSession.getSessionId ( )
```

5.77.2.4 getTask()

```
List<SimulationTask<?> > quasylab.sibilla.core.past.SimulationSession.getTask (
            int n )
```

5.77.2.5 isRunning()

```
boolean quasylab.sibilla.core.past.SimulationSession.isRunning ( )
```

5.77.2.6 join()

```
void quasylab.sibilla.core.past.SimulationSession.join ( ) throws InterruptedException
```

5.77.2.7 nextTask()

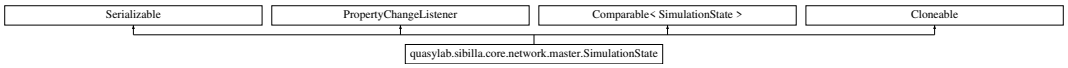
```
SimulationTask<?> quasylab.sibilla.core.past.SimulationSession.nextTask ( )
```

5.77.2.8 shutdown()

```
void quasylab.sibilla.core.past.SimulationSession.shutdown ( ) throws InterruptedException
```

5.78 quasylab.sibilla.core.network.master.SimulationState Class Reference

Inheritance diagram for quasylab.sibilla.core.network.master.SimulationState:



Public Member Functions

- SimulationState (MasterState masterState, NetworkInfo masterNetworkInfo, NetworkInfo clientNetworkInfo, Set< NetworkInfo > slaveNetworkInfos, MasterServerSimulationEnvironment masterServerSimulation↩ Environment)
- String getSimulationModelName ()
- void setSimulationModelName (String simulationModelName)
- void propertyChange (PropertyChangeEvent propertyChangeEvent)
- int compareTo (SimulationState simulationState)
- synchronized void addPropertyChangeListener (String property, PropertyChangeListener pcl)
- synchronized void increaseRunningServers ()
- synchronized void decreaseRunningServers ()
- synchronized SlaveState getSlaveStateByServerInfo (NetworkInfo slaveNetworkInfo)
- synchronized Set< SlaveState > getSlaveServersStates ()
- synchronized NetworkInfo getMasterNetworkInfo ()
- synchronized NetworkInfo getClientNetworkInfo ()
- synchronized int getRegisteredSlaveServers ()
- synchronized int getRunningSlaveServers ()
- synchronized Date getSimulationStartDate ()
- synchronized Date getLastUpdate ()
- synchronized int getPendingTasks ()
- synchronized void setPendingTasks (int pendingTasks)
- synchronized int getTotalSimulationTasks ()
- boolean isConcluded ()
- synchronized void setConcluded ()
- SimulationDataSet<?> simulationDataSet ()
- void setSimulationDataSet (SimulationDataSet<?> simulationDataSet)
- TCPNetworkManager clientConnection ()
- void setClientConnection (TCPNetworkManager clientConnection)
- SimulationState clone ()
- boolean equals (Object o)
- int hashCode ()

5.78.1 Detailed Description

Wraps the state of a client submitted simulation. Its updates can be listened by java.beans.PropertyChangeListener instances.

Author

Stelluti Francesco Pio

Zamponi Marco

5.78.2 Constructor & Destructor Documentation

5.78.2.1 SimulationState()

```
quasylab.sibilla.core.network.master.SimulationState.SimulationState (
            MasterState masterState,
            NetworkInfo masterNetworkInfo,
            NetworkInfo clientNetworkInfo,
            Set< NetworkInfo > slaveNetworkInfos,
            MasterServerSimulationEnvironment masterServerSimulationEnvironment )
```

Initializes the state

Parameters

masterState	the state of the master that initiated the simulation. It will be updated at every simulation update.
masterNetworkInfo	related to the master that initiated the simulation.
clientNetworkInfo	related to the client that submitted the simulation.
slaveNetworkInfos	related to the slave servers the simulation will be submitted to.
masterServerSimulationEnvironment	the environment that manages the simulation. It will be updated at every simulation update.

5.78.3 Member Function Documentation

5.78.3.1 addPropertyChangeListener()

```
synchronized void quasylab.sibilla.core.network.master.SimulationState.addPropertyChange↩
Listener (
            String property,
            PropertyChangeListener pcl )
```

5.78.3.2 clientConnection()

```
TCPNetworkManager quasylab.sibilla.core.network.master.SimulationState.clientConnection ( )
```

Returns

The client communication related manager.

5.78.3.3 clone()

```
SimulationState quasylab.sibilla.core.network.master.SimulationState.clone ( )
```

Returns

a deep clone of the quasylab.sibilla.core.network.master.SimulationState in which is called.

5.78.3.4 compareTo()

```
int quasylab.sibilla.core.network.master.SimulationState.compareTo (
            SimulationState simulationState )
```

Compares two simulation states for ordering.

Parameters

simulationState	the quasylab.sibilla.core.network.master.SimulationState to be compared.

Returns

the result of the compareTo method called on the lastUpdate instance.

5.78.3.5 decreaseRunningServers()

```
synchronized void quasylab.sibilla.core.network.master.SimulationState.decreaseRunningServers
( )
```

Decreases the number of slave servers that are executing simulations.

5.78.3.6 equals()

```
boolean quasylab.sibilla.core.network.master.SimulationState.equals (
            Object o )
```

5.78.3.7 getClientNetworkInfo()

```
synchronized NetworkInfo quasylab.sibilla.core.network.master.SimulationState.getClient↩
NetworkInfo ( )
```

Returns

Network related infos about the client that submitted the simulation.

5.78.3.8 getLastUpdate()

```
synchronized Date quasylab.sibilla.core.network.master.SimulationState.getLastUpdate ( )
```

Returns

The last time the state was updated.

5.78.3.9 getMasterNetworkInfo()

```
synchronized NetworkInfo quasylab.sibilla.core.network.master.SimulationState.getMaster↩
NetworkInfo ( )
```

Returns

Network related infos about the master server that initiated the simulation.

5.78.3.10 getPendingTasks()

```
synchronized int quasylab.sibilla.core.network.master.SimulationState.getPendingTasks ( )
```

Returns

The number of pending simulation tasks.

5.78.3.11 getRegisteredSlaveServers()

```
synchronized int quasylab.sibilla.core.network.master.SimulationState.getRegisteredSlave↩
Servers ( )
```

Returns

the number of registered and running slave servers.

5.78.3.12 getRunningSlaveServers()

```
synchronized int quasylab.sibilla.core.network.master.SimulationState.getRunningSlaveServers (
)
```

Returns

The number of slave servers that are currently executing the simulation.

5.78.3.13 getSimulationModelName()

```
String quasylab.sibilla.core.network.master.SimulationState.getSimulationModelName ( )
```

Returns

the simulation model name.

5.78.3.14 getSimulationStartDate()

```
synchronized Date quasylab.sibilla.core.network.master.SimulationState.getSimulationStartDate
( )
```

Returns

The date the simulation was initiated.

5.78.3.15 getSlaveServersStates()

```
synchronized Set<SlaveState> quasylab.sibilla.core.network.master.SimulationState.getSlave↩
ServersStates ( )
```

Returns

java.util.Set related to registered slave servers' states.

5.78.3.16 getSlaveStateByServerInfo()

```
synchronized SlaveState quasylab.sibilla.core.network.master.SimulationState.getSlaveStateBy↩
ServerInfo (
            NetworkInfo slaveNetworkInfo )
```

Returns the state associated with a specific slave server.

Parameters

slaveNetworkInfo	related to the slave.

Returns

quasylab.sibilla.core.network.slave.SlaveState associated with the slave, null if the slave requested was not present.

5.78.3.17 getTotalSimulationTasks()

```
synchronized int quasylab.sibilla.core.network.master.SimulationState.getTotalSimulationTasks
( )
```

Returns

The number of total simulation tasks.

5.78.3.18 hashCode()

```
int quasylab.sibilla.core.network.master.SimulationState.hashCode ( )
```

5.78.3.19 increaseRunningServers()

```
synchronized void quasylab.sibilla.core.network.master.SimulationState.increaseRunningServers
( )
```

Increases the number of slave servers that are executing simulations.

5.78.3.20 isConcluded()

```
boolean quasylab.sibilla.core.network.master.SimulationState.isConcluded ( )
```

Returns

if the simulation is concluded.

5.78.3.21 propertyChange()

```
void quasylab.sibilla.core.network.master.SimulationState.propertyChange (
            PropertyChangeEvent propertyChangeEvent )
```

5.78.3.22 setClientConnection()

```
void quasylab.sibilla.core.network.master.SimulationState.setClientConnection (
            TCPNetworkManager clientConnection )
```

Sets a new client communication related manager.

Parameters

clientConnection	the manager to be set.

5.78.3.23 setConcluded()

```
synchronized void quasylab.sibilla.core.network.master.SimulationState.setConcluded ( )
```

Marks the simulation related to this state as concluded.

5.78.3.24 setPendingTasks()

```
synchronized void quasylab.sibilla.core.network.master.SimulationState.setPendingTasks (
            int pendingTasks )
```

Sets the value of pending simulation tasks.

Parameters

pendingTasks	the value to be set.

5.78.3.25 setSimulationDataSet()

```
void quasylab.sibilla.core.network.master.SimulationState.setSimulationDataSet (
            SimulationDataSet<?> simulationDataSet )
```

Sets a new simulation data set.

Parameters

simulationDataSet	the set to be set.

5.78.3.26 setSimulationModelName()

```
void quasylab.sibilla.core.network.master.SimulationState.setSimulationModelName (
            String simulationModelName )
```

Sets the simulation model name.

Parameters

simulationModelName	the name to be set.

5.78.3.27 simulationDataSet()

```
SimulationDataSet<?> quasylab.sibilla.core.network.master.SimulationState.simulationDataSet (
)
```

Returns

The wrapper related to the simulation datas.

5.79 quasylab.sibilla.core.simulator.SimulationStatus Enum Reference

Public Attributes

- INIT
- RUNNING
- COMPLETED
- CANCELLED

5.79.1 Detailed Description

Author

loreti

5.79.2 Member Data Documentation

5.79.2.1 CANCELLED

```
quasylab.sibilla.core.simulator.SimulationStatus.CANCELLED
```

5.79.2.2 COMPLETED

```
quasylab.sibilla.core.simulator.SimulationStatus.COMPLETED
```

5.79.2.3 INIT

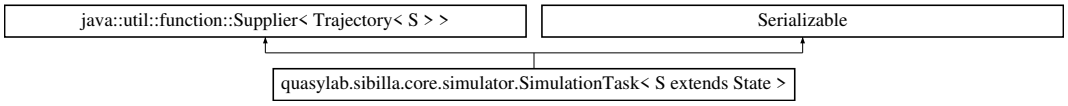
```
quasylab.sibilla.core.simulator.SimulationStatus.INIT
```

5.79.2.4 RUNNING

```
quasylab.sibilla.core.simulator.SimulationStatus.RUNNING
```

5.80 quasylab.sibilla.core.simulator.SimulationTask< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.SimulationTask< S extends State >:



Public Member Functions

- SimulationTask (RandomGenerator random, SimulationUnit< S > unit)
- SimulationTask (int index, RandomGenerator random, SimulationUnit< S > unit)
- void reset ()
- int getIndex ()
- Trajectory< S > get ()
- synchronized void cancel ()
- synchronized boolean isCompleted ()
- synchronized boolean isRunning ()
- synchronized boolean isCancelled ()
- Trajectory< S > getTrajectory ()
- long getElapsedTime ()

5.80.1 Detailed Description

Author

loreti

5.80.2 Constructor & Destructor Documentation

5.80.2.1 SimulationTask() [1/2]

```
quasylab.sibilla.core.simulator.SimulationTask< S extends State >.SimulationTask (
            RandomGenerator random,
            SimulationUnit< S > unit )
```

5.80.2.2 SimulationTask() [2/2]

```
quasylab.sibilla.core.simulator.SimulationTask< S extends State >.SimulationTask (
            int index,
            RandomGenerator random,
            SimulationUnit< S > unit )
```

5.80.3 Member Function Documentation

5.80.3.1 cancel()

```
synchronized void quasylab.sibilla.core.simulator.SimulationTask< S extends State >.cancel ( )
```

5.80.3.2 get()

```
Trajectory<S> quasylab.sibilla.core.simulator.SimulationTask< S extends State >.get ( )
```

5.80.3.3 getElapsedTime()

```
long quasylab.sibilla.core.simulator.SimulationTask< S extends State >.getElapsedTime ( )
```

5.80.3.4 getIndex()

```
int quasylab.sibilla.core.simulator.SimulationTask< S extends State >.getIndex ( )
```

5.80.3.5 getTrajectory()

```
Trajectory<S> quasylab.sibilla.core.simulator.SimulationTask< S extends State >.getTrajectory
( )
```

5.80.3.6 isCancelled()

```
synchronized boolean quasylab.sibilla.core.simulator.SimulationTask< S extends State >.is↩
Cancelled ( )
```

5.80.3.7 isCompleted()

```
synchronized boolean quasylab.sibilla.core.simulator.SimulationTask< S extends State >.is↩
Completed ( )
```

5.80.3.8 isRunning()

```
synchronized boolean quasylab.sibilla.core.simulator.SimulationTask< S extends State >.is↩
Running ( )
```

5.80.3.9 reset()

```
void quasylab.sibilla.core.simulator.SimulationTask< S extends State >.reset ( )
```

5.81 quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries Class Reference

Public Member Functions

- SimulationTimeSeries (String name, double dt, int replications, StatisticalSummary[ ] data)
- String getName ()
- double getMean (int i)
- double getStandardDeviation (int i)
- double getTime (int i)
- double getMean (double t)
- StatisticalSummary[ ] getData ()
- void printTimeSeries (PrintStream out)
- void saveTo (String path) throws FileNotFoundException
- int getSize ()
- double getConfidenceInterval (int i)
- void writeToCSV (StringWriter writer)
- void writeToCSV (PrintWriter writer)

5.81.1 Detailed Description

Author

loreti

5.81.2 Constructor & Destructor Documentation

5.81.2.1 SimulationTimeSeries()

```
quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.SimulationTimeSeries (
            String name,
            double dt,
            int replications,
            StatisticalSummary[] data )
```

5.81.3 Member Function Documentation

5.81.3.1 getConfidenceInterval()

```
double quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.getConfidenceInterval (
            int i )
```

5.81.3.2 getData()

```
StatisticalSummary [] quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.getData (
)
```

5.81.3.3 getMean() [1/2]

```
double quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.getMean (
            double t )
```

5.81.3.4 getMean() [2/2]

```
double quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.getMean (
            int i )
```

5.81.3.5 getName()

```
String quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.getName ( )
```

5.81.3.6 getSize()

```
int quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.getSize ( )
```

5.81.3.7 getStandardDeviation()

```
double quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.getStandardDeviation (
            int i )
```

5.81.3.8 getTime()

```
double quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.getTime (
            int i )
```

5.81.3.9 printTimeSeries()

```
void quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.printTimeSeries (
            PrintStream out )
```

5.81.3.10 saveTo()

```
void quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.saveTo (
            String path ) throws FileNotFoundException
```

5.81.3.11 writeToCSV() [1/2]

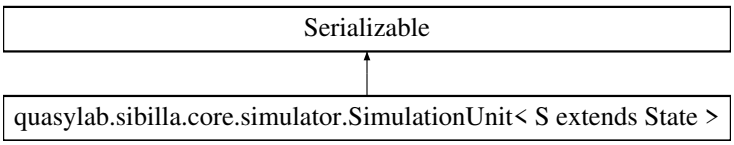
```
void quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.writeToCSV (
            PrintWriter writer )
```

5.81.3.12 writeToCSV() [2/2]

```
void quasylab.sibilla.core.simulator.sampling.SimulationTimeSeries.writeToCSV (
            StringWriter writer )
```

5.82 quasylab.sibilla.core.simulator.SimulationUnit< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.SimulationUnit< S extends State >:



Public Member Functions

- SimulationUnit (Model< S > model, S state, SamplePredicate<? super S > stoppingPredicate)
- SimulationUnit (Model< S > model, S state, SamplePredicate<? super S > stoppingPredicate, StatePredicate<? super S > reachPredicate)
- Model< S > getModel ()
- S getState ()
- SamplePredicate<? super S > getStoppingPredicate ()
- StatePredicate<? super S > getReachPredicate ()

5.82.1 Detailed Description

Author

loreti

5.82.2 Constructor & Destructor Documentation

5.82.2.1 SimulationUnit() [1/2]

```
quasylab.sibilla.core.simulator.SimulationUnit< S extends State >.SimulationUnit (
            Model< S > model,
            S state,
            SamplePredicate<?  super S > stoppingPredicate )
```

5.82.2.2 SimulationUnit() [2/2]

```
quasylab.sibilla.core.simulator.SimulationUnit< S extends State >.SimulationUnit (
            Model< S > model,
            S state,
            SamplePredicate<?  super S > stoppingPredicate,
            StatePredicate<?  super S > reachPredicate )
```

5.82.3 Member Function Documentation

5.82.3.1 getModel()

```
Model<S> quasylab.sibilla.core.simulator.SimulationUnit< S extends State >.getModel ( )
```

5.82.3.2 getReachPredicate()

```
StatePredicate<?  super S> quasylab.sibilla.core.simulator.SimulationUnit< S extends State
>.getReachPredicate ( )
```

Returns

the reachPredicate

5.82.3.3 getState()

```
S quasylab.sibilla.core.simulator.SimulationUnit< S extends State >.getState ( )
```

5.82.3.4 getStoppingPredicate()

```
SamplePredicate<? super S> quasylab.sibilla.core.simulator.SimulationUnit< S extends State
>.getStoppingPredicate ( )
```

Returns

the stoppingPredicate

5.83 quasylab.sibilla.core.network.slave.SlaveCommand Enum Reference

Public Attributes

- PONG
- INIT_RESPONSE
- CLOSE_CONNECTION

5.83.1 Detailed Description

All the possible command and signals that can be sent from a slave server.

Author

Stelluti Francesco Pio

Zamponi Marco

5.83.2 Member Data Documentation

5.83.2.1 CLOSE_CONNECTION

```
quasylab.sibilla.core.network.slave.SlaveCommand.CLOSE_CONNECTION
```

The command sent by a slave server to inform that the connection with an host will be closed.

5.83.2.2 INIT_RESPONSE

```
quasylab.sibilla.core.network.slave.SlaveCommand.INIT_RESPONSE
```

The command sent by a slave server to respond to a master server init command.

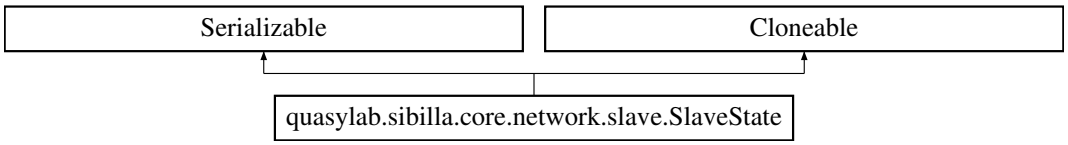
5.83.2.3 PONG

`quasylab.sibilla.core.network.slave.SlaveCommand.PONG`

The command sent by a slave server respond to a master server ping command.

5.84 quasylab.sibilla.core.network.slave.SlaveState Class Reference

Inheritance diagram for quasylab.sibilla.core.network.slave.SlaveState:



Public Member Functions

- SlaveState (SimulationState simulationState, NetworkInfo slaveInfo)
- boolean equals (Object o)
- int hashCode ()
- void update (long elapsedTime, int tasksSent)
- void forceExpiredTimeLimit ()
- void migrate (NetworkInfo newSlaveInfo)
- double getTimeout ()
- double getTimeLimit ()
- boolean canCompleteTask (int tasks)
- synchronized void addPropertyChangeListener (String property, PropertyChangeListener pcl)
- NetworkInfo getSlaveInfo ()
- int getExpectedTasks ()
- boolean isTimeout ()
- boolean isRemoved ()
- void setRemoved ()
- void timedOut ()
- String toString ()
- SlaveState clone ()

Public Attributes

- double devRTT
- double estimatedRTT

5.84.1 Detailed Description

Wraps the state of a slave server. Its updates can be listened by java.beans.PropertyChangeListener instances.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.84.2 Constructor & Destructor Documentation

5.84.2.1 SlaveState()

```
quasylab.sibilla.core.network.slave.SlaveState.SlaveState (
            SimulationState simulationState,
            NetworkInfo slaveInfo )
```

5.84.3 Member Function Documentation

5.84.3.1 addPropertyChangeListener()

```
synchronized void quasylab.sibilla.core.network.slave.SlaveState.addPropertyChangeListener (
            String property,
            PropertyChangeListener pcl )
```

5.84.3.2 canCompleteTask()

```
boolean quasylab.sibilla.core.network.slave.SlaveState.canCompleteTask (
            int tasks )
```

Gets the possibility to complete a certain number of tasks for this server whithin the time limit

Parameters

tasks	number of tasks to be executed

Returns

whether the server can execute these tasks in time or not

5.84.3.3 clone()

```
SlaveState quasylab.sibilla.core.network.slave.SlaveState.clone ( )
```

5.84.3.4 equals()

```
boolean quasylab.sibilla.core.network.slave.SlaveState.equals (
            Object o )
```

5.84.3.5 forceExpiredTimeLimit()

```
void quasylab.sibilla.core.network.slave.SlaveState.forceExpiredTimeLimit ( )
```

Lowers the expected tasks following the TCP window size algorithm and signals it to the listeners

5.84.3.6 getExpectedTasks()

```
int quasylab.sibilla.core.network.slave.SlaveState.getExpectedTasks ( )
```

Returns

number of tasks that the slave server is expected to execute within the set time limit.

5.84.3.7 getSlaveInfo()

```
NetworkInfo quasylab.sibilla.core.network.slave.SlaveState.getSlaveInfo ( )
```

Returns

the network related info about this slave server.

5.84.3.8 getTimeLimit()

```
double quasylab.sibilla.core.network.slave.SlaveState.getTimeLimit ( )
```

Gets the time limit of this server after which the expected tasks are halved

Returns

time limit length of this server

5.84.3.9 getTimeout()

```
double quasylab.sibilla.core.network.slave.SlaveState.getTimeout ( )
```

Gets timeout time of this server after which the server is removed

Returns

timeout length of this server

5.84.3.10 hashCode()

```
int quasylab.sibilla.core.network.slave.SlaveState.hashCode ( )
```

5.84.3.11 isRemoved()

```
boolean quasylab.sibilla.core.network.slave.SlaveState.isRemoved ( )
```

Returns

whether this slave server has been removed from the master server known slaves.

5.84.3.12 isTimeout()

```
boolean quasylab.sibilla.core.network.slave.SlaveState.isTimeout ( )
```

Returns

whether this slave server didn't send computation results to a master within time limit.

5.84.3.13 migrate()

```
void quasylab.sibilla.core.network.slave.SlaveState.migrate (
            NetworkInfo newSlaveInfo )
```

Migrates the network info from this slave server to another slave server

5.84.3.14 setRemoved()

```
void quasylab.sibilla.core.network.slave.SlaveState.setRemoved ( )
```

Sets this server as removed and updates his listeners

5.84.3.15 timedOut()

```
void quasylab.sibilla.core.network.slave.SlaveState.timedOut ( )
```

Sets this server as timed out and updates his listeners

5.84.3.16 toString()

```
String quasylab.sibilla.core.network.slave.SlaveState.toString ( )
```

5.84.3.17 update()

```
void quasylab.sibilla.core.network.slave.SlaveState.update (
            long elapsedTime,
            int tasksSent )
```

Updates the state of the slave server given the data about new executions

Parameters

elapsedTime	time used to execute the tasks
tasksSent	number of tasks executed

5.84.4 Member Data Documentation

5.84.4.1 devRTT

```
double quasylab.sibilla.core.network.slave.SlaveState.devRTT
```

The standard deviation of the round trip time of the simulation tasks execution

5.84.4.2 estimatedRTT

```
double quasylab.sibilla.core.network.slave.SlaveState.estimatedRTT
```

The estimated round trip time of the simulation tasks to be executed

5.85 quasylab.sibilla.core.network.util.SSLUtils Class Reference

Public Member Functions

- void setKeyStorePath (String keyStorePath)
- void setKeyStorePass (String keyStorePass)
- void setKeyStoreType (String keyStoreType)
- void setTrustStorePath (String trustStorePath)
- void setTrustStorePass (String trustStorePass)
- void setTrustStoreType (String trustStoreType)
- SSLContext createSSLContext () throws IOException

Static Public Member Functions

- static SSLUtils getInstance ()

5.85.1 Detailed Description

Utility class used to store the data used to initiate a TLS connection and to easily create SSLContext instances

Author

Stelluti Francesco Pio

Zamponi Marco

5.85.2 Member Function Documentation

5.85.2.1 createSSLContext()

```
SSLContext quasylab.sibilla.core.network.util.SSLUtils.createSSLContext ( ) throws IOException
```

Creates the SSLContext with the parameters that has been set previously.

Returns

SSLContext used to create a secure connection

Exceptions

IOException	when TrustStores and KeyStores filer are invalid.

5.85.2.2 getInstance()

```
static SSLUtils quasylab.sibilla.core.network.util.SSLUtils.getInstance ( )  [static]
```

5.85.2.3 setKeyStorePass()

```
void quasylab.sibilla.core.network.util.SSLUtils.setKeyStorePass (
            String keyStorePass )
```

5.85.2.4 setKeyStorePath()

```
void quasylab.sibilla.core.network.util.SSLUtils.setKeyStorePath (
            String keyStorePath )
```

5.85.2.5 setKeyStoreType()

```
void quasylab.sibilla.core.network.util.SSLUtils.setKeyStoreType (
            String keyStoreType )
```

5.85.2.6 setTrustStorePass()

```
void quasylab.sibilla.core.network.util.SSLUtils.setTrustStorePass (
            String trustStorePass )
```

5.85.2.7 setTrustStorePath()

```
void quasylab.sibilla.core.network.util.SSLUtils.setTrustStorePath (
            String trustStorePath )
```

5.85.2.8 setTrustStoreType()

```
void quasylab.sibilla.core.network.util.SSLUtils.setTrustStoreType (
            String trustStoreType )
```

5.86 quasylab.sibilla.core.network.util.StartupUtils Class Reference

Static Public Member Functions

- static Map< String, String > parseOptions (String[] args)
- static TCPNetworkManagerType TCPNetworkManagerParser (String type)
- static UDPNetworkManagerType UDPNetworkManagerParser (String type)

5.86.1 Detailed Description

Utility class used to create startup classes for new masters, slaves and servers.

Author

Stelluti Francesco Pio

Zamponi Marco

5.86.2 Member Function Documentation

5.86.2.1 parseOptions()

```
static Map<String, String> quasylab.sibilla.core.network.util.StartupUtils.parseOptions (
            String[] args )  [static]
```

Parameters

args	from the console

Returns

Map containing all the console startup args and the related values

5.86.2.2 TCPNetworkManagerParser()

```
static TCPNetworkManagerType quasylab.sibilla.core.network.util.StartupUtils.TCPNetwork↩
ManagerParser (
            String type )  [static]
```

Parameters

type	name of the quasylab.sibilla.core.network.communication.TCPNetworkManagerType to obtain

Returns

quasylab.sibilla.core.network.communication.TCPNetworkManagerType related to the name passed as argument

5.86.2.3 UDPNetworkManagerParser()

```
static UDPNetworkManagerType quasylab.sibilla.core.network.util.StartupUtils.UDPNetwork↩
ManagerParser (
            String type )  [static]
```

Parameters

type	name of the quasylab.sibilla.core.network.communication.UDPNetworkManagerType to obtain

Returns

quasylab.sibilla.core.network.communication.UDPNetworkManagerType related to the name passed as argument

5.87 quasylab.sibilla.core.markov.State Class Reference

Public Member Functions

- State (int ... state)
- int[ ] getState ()
- int retrieve (int idx)
- int hashCode ()
- boolean equals (Object obj)
- String toString ()

5.87.1 Constructor & Destructor Documentation

5.87.1.1 State()

```
quasylab.sibilla.core.markov.State.State (
            int ...  state )
```

5.87.2 Member Function Documentation

5.87.2.1 equals()

```
boolean quasylab.sibilla.core.markov.State.equals (
            Object obj )
```

5.87.2.2 getState()

```
int [] quasylab.sibilla.core.markov.State.getState ( )
```

5.87.2.3 hashCode()

```
int quasylab.sibilla.core.markov.State.hashCode ( )
```

5.87.2.4 retrieve()

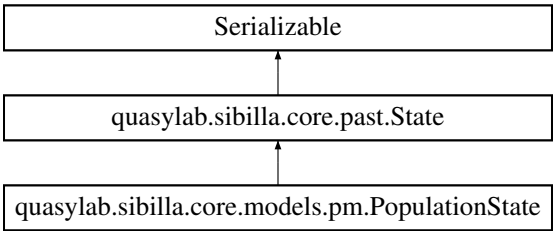
```
int quasylab.sibilla.core.markov.State.retrieve (
            int idx )
```

5.87.2.5 toString()

```
String quasylab.sibilla.core.markov.State.toString ( )
```

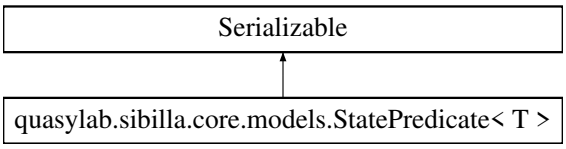
5.88 quasylab.sibilla.core.past.State Interface Reference

Inheritance diagram for quasylab.sibilla.core.past.State:



5.89 quasylab.sibilla.core.models.StatePredicate< T > Interface Template Reference

Inheritance diagram for quasylab.sibilla.core.models.StatePredicate< T >:



Public Member Functions

- boolean check (T t)

Public Attributes

- StatePredicate< Object > TRUE = s -> true

5.89.1 Detailed Description

Indicates a condition or an event that we can observe in a state.

Parameters

<T>	

5.89.2 Member Function Documentation

5.89.2.1 check()

```
boolean quasylab.sibilla.core.models.StatePredicate< T >.check (
            T t )
```

Checks if a state satisfies the predicate.

Parameters

t	a state

Returns

true if the state `t` satisfies the predicate.

5.89.3 Member Data Documentation

5.89.3.1 TRUE

```
StatePredicate<Object> quasylab.sibilla.core.models.StatePredicate< T >.TRUE = s -> true
```

5.90 quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES Enum Reference

Public Attributes

- S1
- S2
- S3
- S4
- S5
- S6
- S7
- D1
- D2
- D3
- D4
- D5
- D6

5.90.1 Member Data Documentation

5.90.1.1 D1

```
quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.D1
```

5.90.1.2 D2

```
quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.D2
```

5.90.1.3 D3

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.D3

5.90.1.4 D4

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.D4

5.90.1.5 D5

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.D5

5.90.1.6 D6

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.D6

5.90.1.7 S1

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.S1

5.90.1.8 S2

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.S2

5.90.1.9 S3

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.S3

5.90.1.10 S4

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.S4

5.90.1.11 S5

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.S5

5.90.1.12 S6

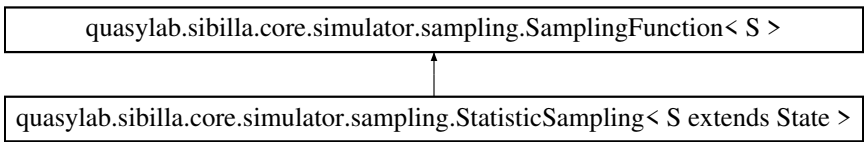
quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.S6

5.90.1.13 S7

quasylab.sibilla.core.markov.TestKnutYaoAlgorithm.STATES.S7

5.91 quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >:



Public Member Functions

- StatisticSampling (int samples, double dt, Measure< S > measure)
- void sample (double time, S context)
- void end (double time)
- void start ()
- String getName ()
- void printTimeSeries (Function< String, String > nameFunction) throws FileNotFoundException
- void printTimeSeries (Function< String, String > nameFunction, char separator) throws FileNotFound↩ Exception
- void printTimeSeries (Function< String, String > nameFunction, char separator, double significance) throws FileNotFoundException
- LinkedList< SimulationTimeSeries > getSimulationTimeSeries (int replications)
- int getSize ()

Static Public Member Functions

- static< S extends State > StatisticSampling< S > measure (String name, int samplings, double deadline, MeasureFunction< S > m)

5.91.1 Detailed Description

Author

loreti

5.91.2 Constructor & Destructor Documentation

5.91.2.1 StatisticSampling()

```
quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >.StatisticSampling
(
            int samples,
            double dt,
            Measure< S > measure )
```

5.91.3 Member Function Documentation

5.91.3.1 end()

```
void quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >.end (
            double time )
```

5.91.3.2 getName()

```
String quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >.getName (
)
```

5.91.3.3 getSimulationTimeSeries()

```
LinkedList<SimulationTimeSeries> quasylab.sibilla.core.simulator.sampling.StatisticSampling<
S extends State >.getSimulationTimeSeries (
            int replications )
```

5.91.3.4 getSize()

```
int quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >.getSize ( )
```

5.91.3.5 measure()

```
static <S extends State> StatisticSampling<S> quasylab.sibilla.core.simulator.sampling.StatisticSampling<
S extends State >.measure (
            String name,
            int samplings,
            double deadline,
            MeasureFunction< S > m )  [static]
```

5.91.3.6 printTimeSeries() [1/3]

```
void quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >.printTime↩
Series (
            Function< String, String > nameFunction ) throws FileNotFoundException
```

5.91.3.7 printTimeSeries() [2/3]

```
void quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >.printTime↩
Series (
            Function< String, String > nameFunction,
            char separator ) throws FileNotFoundException
```

5.91.3.8 printTimeSeries() [3/3]

```
void quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >.printTime↩
Series (
            Function< String, String > nameFunction,
            char separator,
            double significance ) throws FileNotFoundException
```

5.91.3.9 sample()

```
void quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >.sample (
            double time,
            S context )
```

5.91.3.10 start()

```
void quasylab.sibilla.core.simulator.sampling.StatisticSampling< S extends State >.start ( )
```

5.92 quasylab.sibilla.core.markov.SteadyStateSolver< S > Class Template Reference

Public Member Functions

- SteadyStateSolver (ContinuousTimeMarkovChain< S > chain, S init)
- void computeBSCC ()

5.92.1 Detailed Description

Author

loreti

Parameters

<S>	

5.92.2 Constructor & Destructor Documentation

5.92.2.1 SteadyStateSolver()

```
quasylab.sibilla.core.markov.SteadyStateSolver< S >.SteadyStateSolver (
            ContinuousTimeMarkovChain< S > chain,
            S init )
```

5.92.3 Member Function Documentation

5.92.3.1 computeBSCC()

```
void quasylab.sibilla.core.markov.SteadyStateSolver< S >.computeBSCC ( )
```

5.93 quasylab.sibilla.core.models.StepFunction< S > Interface Template Reference

Public Member Functions

- S step (RandomGenerator r, double now, double dt)

5.93.1 Detailed Description

Implements the lazy evaluation of the transition step of a stochastic model.

5.93.2 Member Function Documentation

5.93.2.1 step()

```
S quasylab.sibilla.core.models.StepFunction< S >.step (
            RandomGenerator r,
            double now,
            double dt )
```

Computes the next state associated to a transition.

Parameters

r	random
now	
dt	

Returns

5.94 quasylab.sibilla.core.markov.TaxiScenarioMC Class Reference

Static Public Member Functions

- static HashMap< State, Double > next (State s)
- static ContinuousTimeMarkovChain< State > generateCTMC ()
- static void main (String[ ] args)

Static Public Attributes

- static int T = 0
- static int U = 1
- static int TS = 2
- static int TL = 3
- static int MAX_USERS = 6
- static int NUMBER_OF_TAXIS = 10
- static double LAMBDA = 1.0/5.0
- static double BETA = 1.0
- static double MU_SHORT = 1.0/10.0
- static double MU_LONG = 1.0/30.0
- static double P_SHORT = 0.5

5.94.1 Member Function Documentation

5.94.1.1 generateCTMC()

```
static ContinuousTimeMarkovChain<State> quasylab.sibilla.core.markov.TaxiScenarioMC.generate↩
CTMC ( )  [static]
```

5.94.1.2 main()

```
static void quasylab.sibilla.core.markov.TaxiScenarioMC.main (
            String[] args )  [static]
```

5.94.1.3 next()

```
static HashMap<State,Double> quasylab.sibilla.core.markov.TaxiScenarioMC.next (
            State s )  [static]
```

5.94.2 Member Data Documentation

5.94.2.1 BETA

```
double quasylab.sibilla.core.markov.TaxiScenarioMC.BETA = 1.0  [static]
```

5.94.2.2 LAMBDA

```
double quasylab.sibilla.core.markov.TaxiScenarioMC.LAMBDA = 1.0/5.0  [static]
```

5.94.2.3 MAX_USERS

```
int quasylab.sibilla.core.markov.TaxiScenarioMC.MAX_USERS = 6  [static]
```

5.94.2.4 MU_LONG

```
double quasylab.sibilla.core.markov.TaxiScenarioMC.MU_LONG = 1.0/30.0  [static]
```

5.94.2.5 MU_SHORT

```
double quasylab.sibilla.core.markov.TaxiScenarioMC.MU_SHORT = 1.0/10.0  [static]
```

5.94.2.6 NUMBER_OF_TAXIS

```
int quasylab.sibilla.core.markov.TaxiScenarioMC.NUMBER_OF_TAXIS = 10  [static]
```

5.94.2.7 P_SHORT

```
double quasylab.sibilla.core.markov.TaxiScenarioMC.P_SHORT = 0.5  [static]
```

5.94.2.8 T

```
int quasylab.sibilla.core.markov.TaxiScenarioMC.T = 0  [static]
```

5.94.2.9 TL

```
int quasylab.sibilla.core.markov.TaxiScenarioMC.TL = 3  [static]
```

5.94.2.10 TS

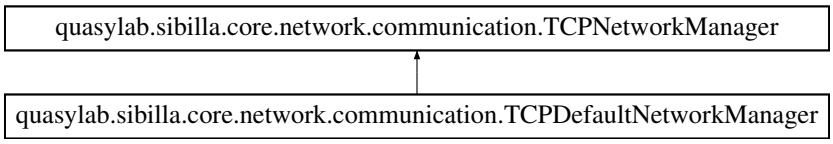
```
int quasylab.sibilla.core.markov.TaxiScenarioMC.TS = 2  [static]
```

5.94.2.11 U

```
int quasylab.sibilla.core.markov.TaxiScenarioMC.U = 1  [static]
```

5.95 quasylab.sibilla.core.network.communication.TCPDefaultNetwork↩ Manager Class Reference

Inheritance diagram for quasylab.sibilla.core.network.communication.TCPDefaultNetworkManager:



Public Member Functions

- TCPDefaultNetworkManager (Socket socket) throws IOException
- byte[ ] readObject () throws IOException
- void writeObject (byte[ ] toWrite) throws IOException
- Socket getSocket ()
- void closeConnection () throws IOException
- TCPNetworkManagerType getType ()

Additional Inherited Members

5.95.1 Detailed Description

Simple TCP based communication class.

Author

Belenchia Matteo
Stelluti Francesco Pio
Zamponi Marco

5.95.2 Constructor & Destructor Documentation

5.95.2.1 TCPDefaultNetworkManager()

```
quasylab.sibilla.core.network.communication.TCPDefaultNetworkManager.TCPDefaultNetworkManager
(
            Socket socket ) throws IOException
```

Initiates the manager. The socket upon which the communication is based has already been built.

Parameters

socket	upon which the network communication will be based

Exceptions

IOException	

5.95.3 Member Function Documentation

5.95.3.1 closeConnection()

```
void quasylab.sibilla.core.network.communication.TCPDefaultNetworkManager.closeConnection ( )
throws IOException
```

Closes the network communication.

Exceptions

IOException	

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.95.3.2 getSocket()

```
Socket quasylab.sibilla.core.network.communication.TCPDefaultNetworkManager.getSocket ( )
```

Returns

the Socket upon which is based the network communication.

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.95.3.3 getType()

```
TCPNetworkManagerType quasylab.sibilla.core.network.communication.TCPDefaultNetworkManager.↩
getType ( )
```

Returns

the quasylab.sibilla.core.network.communication.TCPNetworkManagerType associated with the quasylab.sibilla.core.network.co implementation.

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.95.3.4 readObject()

```
byte [] quasylab.sibilla.core.network.communication.TCPDefaultNetworkManager.readObject ( )
throws IOException
```

Reads incoming data from the network.

Returns

byte array of the data read from the network

Exceptions

IOException	

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.95.3.5 writeObject()

```
void quasylab.sibilla.core.network.communication.TCPDefaultNetworkManager.writeObject (
            byte[] toWrite ) throws IOException
```

Sends data through the network.

Parameters

toWrite	byte array of data that will be sent over

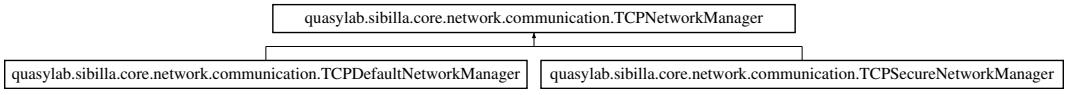
Exceptions

IOException	

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.96 quasylab.sibilla.core.network.communication.TCPNetworkManager Interface Reference

Inheritance diagram for quasylab.sibilla.core.network.communication.TCPNetworkManager:



Public Member Functions

- byte[ ] readObject () throws IOException
- void writeObject (byte[ ] toWrite) throws IOException
- Socket getSocket ()
- default NetworkInfo getNetworkInfo ()
- void closeConnection () throws IOException
- TCPNetworkManagerType getType ()

Static Public Member Functions

- static TCPNetworkManager createNetworkManager (NetworkInfo info) throws IOException
- static TCPNetworkManager createNetworkManager (TCPNetworkManagerType networkType, Socket socket) throws IOException
- static ServerSocket createServerSocket (TCPNetworkManagerType networkType, int port) throws IO↩ Exception

5.96.1 Detailed Description

Interface that needs to be extended from all of the communication related classes that are based upon the TCP transport protocol.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.96.2 Member Function Documentation

5.96.2.1 closeConnection()

```
void quasylab.sibilla.core.network.communication.TCPNetworkManager.closeConnection ( ) throws
IOException
```

Closes the network communication.

Exceptions

IOException	

Implemented in quasylab.sibilla.core.network.communication.TCPSecureNetworkManager, and quasylab.sibilla.core.network.commu

5.96.2.2 createNetworkManager() [1/2]

```
static TCPNetworkManager quasylab.sibilla.core.network.communication.TCPNetworkManager.↩
createNetworkManager (
            NetworkInfo info ) throws IOException  [static]
```

Factory method used to obtain quasylab.sibilla.core.network.communication.TCPNetworkManager implementations' instances. Used in classes that want to initiate a network communication.

Parameters

info	The network related infos about the connection that the manager will manage

Returns

quasylab.sibilla.core.network.communication.TCPNetworkManager that will manage the requested connection

Exceptions

IOException	

5.96.2.3 createNetworkManager() [2/2]

```
static TCPNetworkManager quasylab.sibilla.core.network.communication.TCPNetworkManager.↩
createNetworkManager (
            TCPNetworkManagerType networkType,
            Socket socket ) throws IOException  [static]
```

Factory method used to obtain quasylab.sibilla.core.network.communication.TCPNetworkManager implementations' instances. Used in classes that want to initiate a network communication.

Parameters

networkType	the type associated with the implementation of quasylab.sibilla.core.network.communication.TCPNetworkManager that will be instantiated
socket	upon which the network communication will be based

Returns

quasylab.sibilla.core.network.communication.TCPNetworkManager that will manage the requested connection

Exceptions

IOException	

5.96.2.4 createServerSocket()

```
static ServerSocket quasylab.sibilla.core.network.communication.TCPNetworkManager.create↩
ServerSocket (
            TCPNetworkManagerType networkType,
            int port ) throws IOException  [static]
```

Factory method used to obtain ServerSocket instances. Used in classes that want to accept incoming network communications.

Parameters

networkType	the type associated with the implementation of quasylab.sibilla.core.network.communication.TCPNetworkManager that will be instantiated
port	used to listen for incoming connections

Returns

ServerSocket used to accept incoming connections

Exceptions

IOException	

5.96.2.5 getNetworkInfo()

```
default NetworkInfo quasylab.sibilla.core.network.communication.TCPNetworkManager.getNetwork↩
Info ( )
```

Returns

a copy of the quasylab.sibilla.core.network.NetworkInfo instance associated with the manager.

5.96.2.6 getSocket()

```
Socket quasylab.sibilla.core.network.communication.TCPNetworkManager.getSocket ( )
```

Returns

the Socket upon which is based the network communication.

Implemented in quasylab.sibilla.core.network.communication.TCPSecureNetworkManager, and quasylab.sibilla.core.network.commu

5.96.2.7 getType()

```
TCPNetworkManagerType quasylab.sibilla.core.network.communication.TCPNetworkManager.getType (
)
```

Returns

the quasylab.sibilla.core.network.communication.TCPNetworkManagerType associated with the quasylab.sibilla.core.network.co implementation.

Implemented in quasylab.sibilla.core.network.communication.TCPSecureNetworkManager, and quasylab.sibilla.core.network.commu

5.96.2.8 readObject()

```
byte [] quasylab.sibilla.core.network.communication.TCPNetworkManager.readObject ( ) throws
IOException
```

Reads incoming data from the network.

Returns

byte array of the data read from the network

Exceptions

IOException	

Implemented in quasylab.sibilla.core.network.communication.TCPSecureNetworkManager, and quasylab.sibilla.core.network.commu

5.96.2.9 writeObject()

```
void quasylab.sibilla.core.network.communication.TCPNetworkManager.writeObject (
            byte[] toWrite ) throws IOException
```

Sends data through the network.

Parameters

toWrite	byte array of data that will be sent over

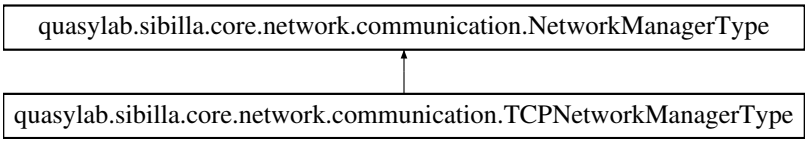
Exceptions

IOException	

Implemented in quasylab.sibilla.core.network.communication.TCPSecureNetworkManager, and quasylab.sibilla.core.network.commu

5.97 quasylab.sibilla.core.network.communication.TCPNetwork↩ ManagerType Enum Reference

Inheritance diagram for quasylab.sibilla.core.network.communication.TCPNetworkManagerType:



Public Attributes

- DEFAULT
- SECURE

5.97.1 Detailed Description

All of the names associated to the classes that implement quasylab.sibilla.core.network.communication.TCPNetworkManager and are based upon the TCP transport protocol.

Author

Belenchia Matteo

Stelluti Francesco Pio

Zamponi Marco

5.97.2 Member Data Documentation

5.97.2.1 DEFAULT

`quasylab.sibilla.core.network.communication.TCPNetworkManagerType.DEFAULT`

The simplest interface implementation.

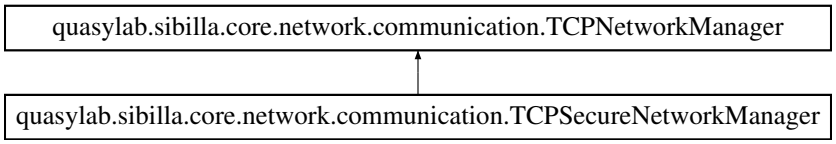
5.97.2.2 SECURE

`quasylab.sibilla.core.network.communication.TCPNetworkManagerType.SECURE`

The implementation that relies upon SSL.

5.98 quasylab.sibilla.core.network.communication.TCPSecureNetwork↩ Manager Class Reference

Inheritance diagram for quasylab.sibilla.core.network.communication.TCPSecureNetworkManager:



Public Member Functions

- TCPSecureNetworkManager (NetworkInfo networkInfo) throws IOException
- TCPSecureNetworkManager (Socket socket) throws IOException
- byte[ ] readObject () throws IOException
- void writeObject (byte[ ] toWrite) throws IOException
- Socket getSocket ()
- void closeConnection () throws IOException
- TCPNetworkManagerType getType ()

Additional Inherited Members

5.98.1 Detailed Description

TCP based communication class that relies on TLS protocol.

Author

Stelluti Francesco Pio

Zamponi Marco

5.98.2 Constructor & Destructor Documentation

5.98.2.1 TCPSecureNetworkManager() [1/2]

```
quasylab.sibilla.core.network.communication.TCPSecureNetworkManager.TCPSecureNetworkManager (
            NetworkInfo networkInfo ) throws IOException
```

Initiates the manager as a client. The socket upon which the communication is based will be built.

Parameters

networkInfo	The network related infos about the connection that the manager will manage

Exceptions

IOException	

5.98.2.2 TCPSecureNetworkManager() [2/2]

```
quasylab.sibilla.core.network.communication.TCPSecureNetworkManager.TCPSecureNetworkManager (
            Socket socket ) throws IOException
```

Initiates the manager as a server. The socket upon which the communication is based has already been built.

Parameters

socket	upon which the network communication will be based

Exceptions

IOException	

5.98.3 Member Function Documentation

5.98.3.1 closeConnection()

```
void quasylab.sibilla.core.network.communication.TCPSecureNetworkManager.closeConnection ( )
throws IOException
```

Closes the network communication.

Exceptions

IOException	

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.98.3.2 getSocket()

```
Socket quasylab.sibilla.core.network.communication.TCPSecureNetworkManager.getSocket ( )
```

Returns

the Socket upon which is based the network communication.

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.98.3.3 getType()

```
TCPNetworkManagerType quasylab.sibilla.core.network.communication.TCPSecureNetworkManager.↩
getType ( )
```

Returns

the quasylab.sibilla.core.network.communication.TCPNetworkManagerType associated with the quasylab.sibilla.core.network.co implementation.

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.98.3.4 readObject()

```
byte [] quasylab.sibilla.core.network.communication.TCPSecureNetworkManager.readObject ( )
throws IOException
```

Reads incoming data from the network.

Returns

byte array of the data read from the network

Exceptions

IOException	

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.98.3.5 writeObject()

```
void quasylab.sibilla.core.network.communication.TCPSecureNetworkManager.writeObject (
            byte[] toWrite ) throws IOException
```

Sends data through the network.

Parameters

toWrite	byte array of data that will be sent over

Exceptions

IOException	

Implements quasylab.sibilla.core.network.communication.TCPNetworkManager.

5.99 quasylab.sibilla.core.past.ds.Template Class Reference

Public Member Functions

- Template (TemplateField... fields)
- int size ()
- boolean match (Tuple t)
- boolean match (int i, Object o)
- int hashCode ()
- boolean equals (Object obj)
- String toString ()
- TemplateField get (int i)
- boolean implies (Template t)

5.99.1 Detailed Description

Author

loreti

5.99.2 Constructor & Destructor Documentation

5.99.2.1 Template()

```
quasylab.sibilla.core.past.ds.Template.Template (
            TemplateField...  fields )
```

5.99.3 Member Function Documentation

5.99.3.1 equals()

```
boolean quasylab.sibilla.core.past.ds.Template.equals (
            Object obj )
```

5.99.3.2 get()

```
TemplateField quasylab.sibilla.core.past.ds.Template.get (
            int i )
```

5.99.3.3 hashCode()

```
int quasylab.sibilla.core.past.ds.Template.hashCode ( )
```

5.99.3.4 implies()

```
boolean quasylab.sibilla.core.past.ds.Template.implies (
            Template t )
```

5.99.3.5 match() [1/2]

```
boolean quasylab.sibilla.core.past.ds.Template.match (
            int i,
            Object o )
```

5.99.3.6 match() [2/2]

```
boolean quasylab.sibilla.core.past.ds.Template.match (
            Tuple t )
```

5.99.3.7 size()

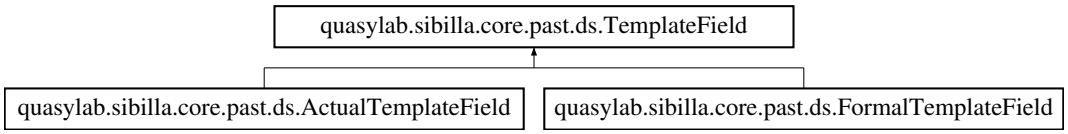
```
int quasylab.sibilla.core.past.ds.Template.size ( )
```

5.99.3.8 toString()

```
String quasylab.sibilla.core.past.ds.Template.toString ( )
```

5.100 quasylab.sibilla.core.past.ds.TemplateField Interface Reference

Inheritance diagram for quasylab.sibilla.core.past.ds.TemplateField:



Public Member Functions

- boolean match (Object o)
- boolean implies (TemplateField f)

5.100.1 Detailed Description

Author

loreti

5.100.2 Member Function Documentation

5.100.2.1 implies()

```
boolean quasylab.sibilla.core.past.ds.TemplateField.implies (
            TemplateField f )
```

Implemented in quasylab.sibilla.core.past.ds.FormalTemplateField, and quasylab.sibilla.core.past.ds.ActualTemplateField.

5.100.2.2 match()

```
boolean quasylab.sibilla.core.past.ds.TemplateField.match (
            Object o )
```

Implemented in quasylab.sibilla.core.past.ds.FormalTemplateField, and quasylab.sibilla.core.past.ds.ActualTemplateField.

5.101 quasylab.sibilla.core.simulator.tests.TestMain Class Reference

Static Public Member Functions

- static void main (String[ ] argv)

5.101.1 Detailed Description

Author

loreti

5.101.2 Member Function Documentation

5.101.2.1 main()

```
static void quasylab.sibilla.core.simulator.tests.TestMain.main (
            String[ ] argv )  [static]
```

5.102 quasylab.sibilla.core.simulator.tests.TestTime Class Reference

Static Public Member Functions

- static void main (String[ ] argv) throws FileNotFoundException, InterruptedException, UnknownHostException
- static PopulationState initialState ()

Static Public Attributes

- static final int S = 0
- static final int E = 1
- static final int I = 2
- static final int R = 3
- static final int INIT_S = 99
- static final int INIT_E = 0
- static final int INIT_I = 1
- static final int INIT_R = 0
- static final double N = INIT_S + INIT_E + INIT_I + INIT_R
- static final double LAMBDA_E = 1
- static final double LAMBDA_I = 1 / 3.0
- static final double LAMBDA_R = 1 / 7.0
- static final int SAMPLINGS = 100
- static final double DEADLINE = 600

5.102.1 Detailed Description

Author

loreti

5.102.2 Member Function Documentation

5.102.2.1 initialState()

```
static PopulationState quasylab.sibilla.core.simulator.tests.TestTime.initialState ( )  [static]
```

5.102.2.2 main()

```
static void quasylab.sibilla.core.simulator.tests.TestTime.main (
            String[] argv ) throws FileNotFoundException, InterruptedException, UnknownHost↩
Exception  [static]
```

5.102.3 Member Data Documentation

5.102.3.1 DEADLINE

```
final double quasylab.sibilla.core.simulator.tests.TestTime.DEADLINE = 600  [static]
```

5.102.3.2 E

```
final int quasylab.sibilla.core.simulator.tests.TestTime.E = 1  [static]
```

5.102.3.3 I

```
final int quasylab.sibilla.core.simulator.tests.TestTime.I = 2  [static]
```

5.102.3.4 INIT_E

```
final int quasylab.sibilla.core.simulator.tests.TestTime.INIT_E = 0  [static]
```

5.102.3.5 INIT_I

```
final int quasylab.sibilla.core.simulator.tests.TestTime.INIT_I = 1  [static]
```

5.102.3.6 INIT_R

```
final int quasylab.sibilla.core.simulator.tests.TestTime.INIT_R = 0  [static]
```

5.102.3.7 INIT_S

```
final int quasylab.sibilla.core.simulator.tests.TestTime.INIT_S = 99  [static]
```

5.102.3.8 LAMBDA_E

```
final double quasylab.sibilla.core.simulator.tests.TestTime.LAMBDA_E = 1  [static]
```

5.102.3.9 LAMBDA_I

```
final double quasylab.sibilla.core.simulator.tests.TestTime.LAMBDA_I = 1 / 3.0  [static]
```

5.102.3.10 LAMBDA_R

```
final double quasylab.sibilla.core.simulator.tests.TestTime.LAMBDA_R = 1 / 7.0  [static]
```

5.102.3.11 N

```
final double quasylab.sibilla.core.simulator.tests.TestTime.N = INIT_S + INIT_E + INIT_I +
INIT_R  [static]
```

5.102.3.12 R

```
final int quasylab.sibilla.core.simulator.tests.TestTime.R = 3  [static]
```

5.102.3.13 S

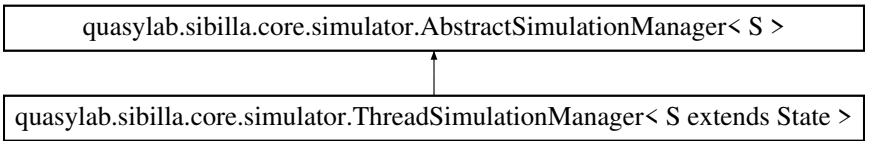
```
final int quasylab.sibilla.core.simulator.tests.TestTime.S = 0  [static]
```

5.102.3.14 SAMPLINGS

```
final int quasylab.sibilla.core.simulator.tests.TestTime.SAMPLINGS = 100  [static]
```

5.103 quasylab.sibilla.core.simulator.ThreadSimulationManager< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.ThreadSimulationManager< S extends State >:



Public Member Functions

- ThreadSimulationManager (RandomGenerator random, SimulationMonitor monitor, Consumer< Trajectory< S >> consumer)
- ThreadSimulationManager (ExecutorService executor, RandomGenerator random, SimulationMonitor monitor, Consumer< Trajectory< S >> consumer)
- synchronized int pendingTasks ()
- synchronized void join () throws InterruptedException
- synchronized void shutdown () throws InterruptedException

Static Public Member Functions

- static final SimulationManagerFactory getThreadSimulationManagerFacotry (ExecutorService executor)
- static final SimulationManagerFactory getFixedThreadSimulationManagerFactory (int n)
- static final SimulationManagerFactory getCachedThreadSimulationManagerFactory ()
- static final SimulationManagerFactory getWorkStealingPoolSimulationManagerFactory ()

Protected Member Functions

- synchronized void handleTask (SimulationTask< S > simulationTask)

5.103.1 Detailed Description

Author

belenchia

5.103.2 Constructor & Destructor Documentation

5.103.2.1 ThreadSimulationManager() [1/2]

```
quasylab.sibilla.core.simulator.ThreadSimulationManager< S extends State >.ThreadSimulationManager
(
            RandomGenerator random,
            SimulationMonitor monitor,
            Consumer< Trajectory< S >> consumer )
```

5.103.2.2 ThreadSimulationManager() [2/2]

```
quasylab.sibilla.core.simulator.ThreadSimulationManager< S extends State >.ThreadSimulationManager
(
            ExecutorService executor,
            RandomGenerator random,
            SimulationMonitor monitor,
            Consumer< Trajectory< S >> consumer )
```

5.103.3 Member Function Documentation

5.103.3.1 getCachedThreadSimulationManagerFactory()

```
static final SimulationManagerFactory quasylab.sibilla.core.simulator.ThreadSimulationManager<
S extends State >.getCachedThreadSimulationManagerFactory ( )  [static]
```

5.103.3.2 getFixedThreadSimulationManagerFactory()

```
static final SimulationManagerFactory quasylab.sibilla.core.simulator.ThreadSimulationManager<
S extends State >.getFixedThreadSimulationManagerFactory (
            int n )  [static]
```

5.103.3.3 getThreadSimulationManagerFacotry()

```
static final SimulationManagerFactory quasylab.sibilla.core.simulator.ThreadSimulationManager<
S extends State >.getThreadSimulationManagerFacotry (
            ExecutorService executor )  [static]
```

5.103.3.4 getWorkStealingPoolSimulationManagerFactory()

```
static final SimulationManagerFactory quasylab.sibilla.core.simulator.ThreadSimulationManager<
S extends State >.getWorkStealingPoolSimulationManagerFactory ( )  [static]
```

5.103.3.5 handleTask()

```
synchronized void quasylab.sibilla.core.simulator.ThreadSimulationManager< S extends State
>.handleTask (
            SimulationTask< S > simulationTask )  [protected]
```

5.103.3.6 join()

```
synchronized void quasylab.sibilla.core.simulator.ThreadSimulationManager< S extends State
>.join ( ) throws InterruptedException
```

5.103.3.7 pendingTasks()

```
synchronized int quasylab.sibilla.core.simulator.ThreadSimulationManager< S extends State
>.pendingTasks ( )
```

5.103.3.8 shutdown()

```
synchronized void quasylab.sibilla.core.simulator.ThreadSimulationManager< S extends State
>.shutdown ( ) throws InterruptedException
```

5.104 quasylab.sibilla.core.models.TimeStep< S > Class Template Reference

Public Member Functions

- TimeStep (double time, S value)
- S getValue ()
- double getTime ()

5.104.1 Detailed Description

Represents the result of a time step. It consists of a value S, that is the one we have the end of the step, and a time length.

Parameters

<*S*>	

5.104.2 Constructor & Destructor Documentation

5.104.2.1 TimeStep()

```
quasylab.sibilla.core.models.TimeStep< S >.TimeStep (
            double time,
            S value )
```

Creates a new time step with a specified length and value.

Parameters

time	the length of time step. This value must be greater than 0.
value	the value at the end of time step. This must be a non null value.

5.104.3 Member Function Documentation

5.104.3.1 getTime()

```
double quasylab.sibilla.core.models.TimeStep< S >.getTime ( )
```

Returns the length of time step.

Returns

the length of time step.

5.104.3.2 getValue()

```
S quasylab.sibilla.core.models.TimeStep< S >.getValue ( )
```

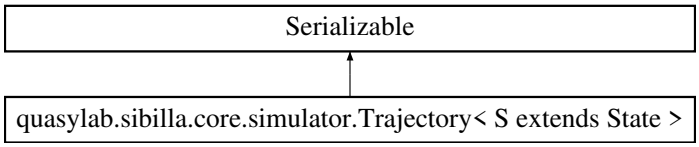
Returns the value at the end of time step.

Returns

the value at the end of time step.

5.105 quasylab.sibilla.core.simulator.Trajectory< S extends State > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.Trajectory< S extends State >:



Public Member Functions

- Trajectory ()
- void add (double time, S value)
- void sample (SamplingFunction< S > f)
- double getStart ()
- double getEnd ()
- int size ()
- boolean isSuccesfull ()
- void setSuccesfull (boolean succesfull)
- long getGenerationTime ()
- void setGenerationTime (long generationTime)

5.105.1 Detailed Description

Author

loreti

5.105.2 Constructor & Destructor Documentation

5.105.2.1 Trajectory()

```
quasylab.sibilla.core.simulator.Trajectory< S extends State >.Trajectory ( )
```

5.105.3 Member Function Documentation

5.105.3.1 add()

```
void quasylab.sibilla.core.simulator.Trajectory< S extends State >.add (
            double time,
            S value )
```

5.105.3.2 getEnd()

```
double quasylab.sibilla.core.simulator.Trajectory< S extends State >.getEnd ( )
```

5.105.3.3 getGenerationTime()

```
long quasylab.sibilla.core.simulator.Trajectory< S extends State >.getGenerationTime ( )
```

Returns

the generationTime

5.105.3.4 getStart()

```
double quasylab.sibilla.core.simulator.Trajectory< S extends State >.getStart ( )
```

5.105.3.5 isSuccesfull()

```
boolean quasylab.sibilla.core.simulator.Trajectory< S extends State >.isSuccesfull ( )
```

Returns

the succesfull

5.105.3.6 sample()

```
void quasylab.sibilla.core.simulator.Trajectory< S extends State >.sample (
            SamplingFunction< S > f )
```

5.105.3.7 setGenerationTime()

```
void quasylab.sibilla.core.simulator.Trajectory< S extends State >.setGenerationTime (
            long generationTime )
```

Parameters

generationTime	the generationTime to set

5.105.3.8 setSuccesfull()

```
void quasylab.sibilla.core.simulator.Trajectory< S extends State >.setSuccesfull (
            boolean succesfull )
```

Parameters

succesfull	the succesfull to set

5.105.3.9 size()

```
int quasylab.sibilla.core.simulator.Trajectory< S extends State >.size ( )
```

5.106 quasylab.sibilla.core.markov.TransientProbabilityContinuousSolver< S > Class Template Reference

Public Member Functions

- TransientProbabilityContinuousSolver (ContinuousTimeMarkovChain< S > chain, double epsilon, S init)
- Map< S, Double > compute (double t)

5.106.1 Detailed Description

Author

loreti

Parameters

<*S*>	

5.106.2 Constructor & Destructor Documentation

5.106.2.1 TransientProbabilityContinuousSolver()

```
quasylab.sibilla.core.markov.TransientProbabilityContinuousSolver< S >.TransientProbabilityContinuousSolver
(
            ContinuousTimeMarkovChain< S > chain,
            double epsilon,
            S init )
```

5.106.3 Member Function Documentation

5.106.3.1 compute()

```
Map<S,Double> quasylab.sibilla.core.markov.TransientProbabilityContinuousSolver< S >.compute
(
            double t )
```

5.107 quasylab.sibilla.core.past.ds.Tuple Class Reference

Public Member Functions

- Tuple (Object... data)
- boolean isInstance (int i, Class<?> clazz)
- int size ()
- Object get (int i)
- int hashCode ()
- boolean equals (Object obj)
- String toString ()

5.107.1 Detailed Description

Author

loreti

5.107.2 Constructor & Destructor Documentation

5.107.2.1 Tuple()

```
quasylab.sibilla.core.past.ds.Tuple.Tuple (
            Object... data )
```

5.107.3 Member Function Documentation

5.107.3.1 equals()

```
boolean quasylab.sibilla.core.past.ds.Tuple.equals (
            Object obj )
```

5.107.3.2 get()

```
Object quasylab.sibilla.core.past.ds.Tuple.get (
            int i )
```

5.107.3.3 hashCode()

```
int quasylab.sibilla.core.past.ds.Tuple.hashCode ( )
```

5.107.3.4 isInstance()

```
boolean quasylab.sibilla.core.past.ds.Tuple.isInstance (
            int i,
            Class<?> clazz )
```

5.107.3.5 size()

```
int quasylab.sibilla.core.past.ds.Tuple.size ( )
```

5.107.3.6 toString()

```
String quasylab.sibilla.core.past.ds.Tuple.toString ( )
```

5.108 quasylab.sibilla.core.past.ds.TupleSpace Class Reference

Classes

- class Node

Public Member Functions

- TupleSpace ()
- boolean put (Tuple t)
- WeightedStructure< GetActivity > get (Template t)
- WeightedStructure< Tuple > query (Template t)
- int copiesOf (Tuple t)
- double weightOf (Tuple t)
- double weightOf (Template t)
- int copiesOf (Template t)

5.108.1 Detailed Description

Author

loreti

5.108.2 Constructor & Destructor Documentation

5.108.2.1 TupleSpace()

```
quasylab.sibilla.core.past.ds.TupleSpace.TupleSpace ( )
```

5.108.3 Member Function Documentation

5.108.3.1 copiesOf() [1/2]

```
int quasylab.sibilla.core.past.ds.TupleSpace.copiesOf (
            Template t )
```

5.108.3.2 copiesOf() [2/2]

```
int quasylab.sibilla.core.past.ds.TupleSpace.copiesOf (
            Tuple t )
```

5.108.3.3 get()

```
WeightedStructure<GetActivity> quasylab.sibilla.core.past.ds.TupleSpace.get (
            Template t )
```

5.108.3.4 put()

```
boolean quasylab.sibilla.core.past.ds.TupleSpace.put (
            Tuple t )
```

5.108.3.5 query()

```
WeightedStructure<Tuple> quasylab.sibilla.core.past.ds.TupleSpace.query (
            Template t )
```

5.108.3.6 weightOf() [1/2]

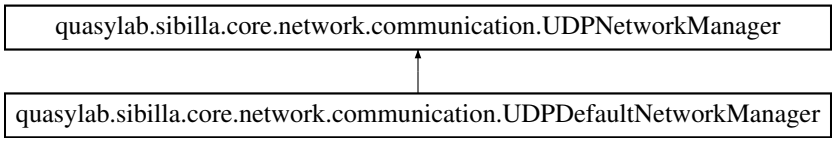
```
double quasylab.sibilla.core.past.ds.TupleSpace.weightOf (
            Template t )
```

5.108.3.7 weightOf() [2/2]

```
double quasylab.sibilla.core.past.ds.TupleSpace.weightOf (
            Tuple t )
```

5.109 quasylab.sibilla.core.network.communication.UDPDefaultNetworkManager Class Reference

Inheritance diagram for quasylab.sibilla.core.network.communication.UDPDefaultNetworkManager:



Public Member Functions

- UDPDefaultNetworkManager (DatagramSocket socket)
- byte[ ] readObject () throws IOException
- void writeObject (byte[ ] toWrite, InetAddress address, int port) throws IOException
- void closeConnection () throws IOException

Additional Inherited Members

5.109.1 Detailed Description

Simple communication class based upon the UDP transport protocol.

Author

Stelluti Francesco Pio

Zamponi Marco

5.109.2 Constructor & Destructor Documentation

5.109.2.1 UDPDefaultNetworkManager()

```
quasylab.sibilla.core.network.communication.UDPDefaultNetworkManager.UDPDefaultNetworkManager
(
            DatagramSocket socket )
```

Initiates the manager as a client. The socket upon which the communication is based has already been built.

Parameters

socket	upon which the network communication will be based

5.109.3 Member Function Documentation

5.109.3.1 closeConnection()

```
void quasylab.sibilla.core.network.communication.UDPDefaultNetworkManager.closeConnection ( )
throws IOException
```

Closes the network communication.

Exceptions

IOException	

Implements quasylab.sibilla.core.network.communication.UDPNetworkManager.

5.109.3.2 readObject()

```
byte [] quasylab.sibilla.core.network.communication.UDPDefaultNetworkManager.readObject ( )
throws IOException
```

Reads incoming data from the network.

Returns

byte array of the data read from the network

Exceptions

IOException	

Implements quasylab.sibilla.core.network.communication.UDPNetworkManager.

5.109.3.3 writeObject()

```
void quasylab.sibilla.core.network.communication.UDPDefaultNetworkManager.writeObject (
            byte[] toWrite,
            InetAddress address,
            int port ) throws IOException
```

Sends data through the network.

Parameters

toWrite	byte array of data that will be sent over
address	used as destination of the data
port	used as destination of the data

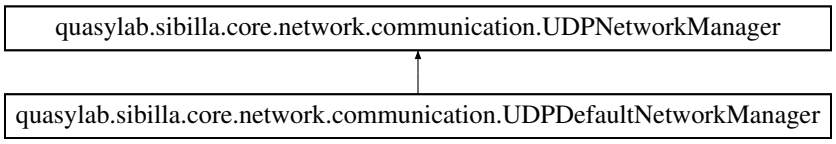
Exceptions

IOException	

Implements quasylab.sibilla.core.network.communication.UDPNetworkManager.

5.110 quasylab.sibilla.core.network.communication.UDPNetwork↩ Manager Interface Reference

Inheritance diagram for quasylab.sibilla.core.network.communication.UDPNetworkManager:



Public Member Functions

- byte[ ] readObject () throws IOException
- void writeObject (byte[ ] toWrite, InetAddress address, int port) throws IOException
- void closeConnection () throws IOException

Static Public Member Functions

- static UDPNetworkManager createNetworkManager (NetworkInfo info, boolean toBroadcast) throws Socket↩ Exception
- static UDPNetworkManager createNetworkManager (UDPNetworkManagerType networkType, Datagram↩ Socket datagramSocket)

5.110.1 Detailed Description

Interface that needs to be extended from all of the communication related classes that are based upon the UDP transport protocol.

Author

Stelluti Francesco Pio

Zamponi Marco

5.110.2 Member Function Documentation

5.110.2.1 closeConnection()

```
void quasylab.sibilla.core.network.communication.UDPNetworkManager.closeConnection ( ) throws
IOException
```

Closes the network communication.

Exceptions

IOException	

Implemented in quasylab.sibilla.core.network.communication.UDPDefaultNetworkManager.

5.110.2.2 createNetworkManager() [1/2]

```
static UDPNetworkManager quasylab.sibilla.core.network.communication.UDPNetworkManager.↩
createNetworkManager (
            NetworkInfo info,
            boolean toBroadcast ) throws SocketException  [static]
```

Factory method used to obtain quasylab.sibilla.core.network.communication.TCPNetworkManager implementations' instances. Used in classes that want to initiate a network communication.

Parameters

info	The network related infos about the connection that the manager will manage
toBroadcast	to mark if the manager will have to send broadcast messages

Returns

quasylab.sibilla.core.network.communication.UDPNetworkManager that will manage the requested connection

Exceptions

SocketException	

5.110.2.3 createNetworkManager() [2/2]

```
static UDPNetworkManager quasylab.sibilla.core.network.communication.UDPNetworkManager.↩
createNetworkManager (
            UDPNetworkManagerType networkType,
            DatagramSocket datagramSocket )  [static]
```

Factory method used to obtain quasylab.sibilla.core.network.communication.TCPNetworkManager implementations' instances. Used in classes that want to initiate a network communication.

Parameters

networkType	the type associated with the implementation of quasylab.sibilla.core.network.communication.UDPNetworkManager that will be instantiated
datagramSocket	upon which the network communication will be based

Returns

quasylab.sibilla.core.network.communication.UDPNetworkManager that will manage the requested connection

5.110.2.4 readObject()

```
byte [] quasylab.sibilla.core.network.communication.UDPNetworkManager.readObject ( ) throws
IOException
```

Reads incoming data from the network.

Returns

byte array of the data read from the network

Exceptions

IOException	

Implemented in quasylab.sibilla.core.network.communication.UDPDefaultNetworkManager.

5.110.2.5 writeObject()

```
void quasylab.sibilla.core.network.communication.UDPNetworkManager.writeObject (
            byte[] toWrite,
            InetAddress address,
            int port ) throws IOException
```

Sends data through the network.

Parameters

toWrite	byte array of data that will be sent over
address	used as destination of the data
port	used as destination of the data

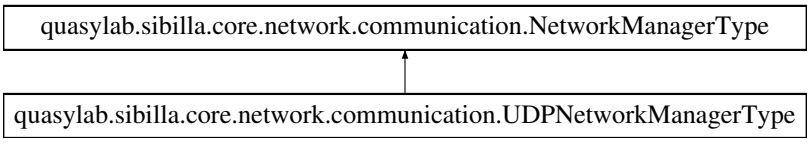
Exceptions

IOException	

Implemented in quasylab.sibilla.core.network.communication.UDPDefaultNetworkManager.

5.111 quasylab.sibilla.core.network.communication.UDPNetwork↩ ManagerType Enum Reference

Inheritance diagram for quasylab.sibilla.core.network.communication.UDPNetworkManagerType:



Public Attributes

- DEFAULT

5.111.1 Detailed Description

All of the names associated to the classes that implement quasylab.sibilla.core.network.communication.UDPNetworkManager and are based upon the UDP transport protocol.

Author

Stelluti Francesco Pio

Zamponi Marco

5.111.2 Member Data Documentation

5.111.2.1 DEFAULT

`quasylab.sibilla.core.network.communication.UDPNetworkManagerType.DEFAULT`

The simplest interface implementation.

5.112 quasylab.sibilla.core.markov.UnboundedReachabilitySolver< S > Class Template Reference

Public Member Functions

- UnboundedReachabilitySolver (MarkovChain< S > chain, Predicate< S > condition, Predicate< S > goal)
- UnboundedReachabilitySolver (MarkovChain< S > chain, Predicate< S > goal)
- Map< S, Double > compute ()

5.112.1 Detailed Description

Author

loreti

Parameters

<S>	

5.112.2 Constructor & Destructor Documentation

5.112.2.1 UnboundedReachabilitySolver() [1/2]

```
quasylab.sibilla.core.markov.UnboundedReachabilitySolver< S >.UnboundedReachabilitySolver (
            MarkovChain< S > chain,
            Predicate< S > condition,
            Predicate< S > goal )
```

5.112.2.2 UnboundedReachabilitySolver() [2/2]

```
quasylab.sibilla.core.markov.UnboundedReachabilitySolver< S >.UnboundedReachabilitySolver (
            MarkovChain< S > chain,
            Predicate< S > goal )
```

5.112.3 Member Function Documentation

5.112.3.1 compute()

```
Map<S,Double> quasylab.sibilla.core.markov.UnboundedReachabilitySolver< S >.compute ( )
```

5.113 quasylab.sibilla.core.models.pm.UnicastRule.UnicastReceiver Class Reference

Public Member Functions

- UnicastReceiver (int receiver, Function< PopulationState, Double > receivingProbability, Function< RandomGenerator, Integer > step)
- int getReceiver ()

5.113.1 Constructor & Destructor Documentation

5.113.1.1 UnicastReceiver()

```
quasylab.sibilla.core.models.pm.UnicastRule.UnicastReceiver.UnicastReceiver (
            int receiver,
            Function< PopulationState, Double > receivingProbability,
            Function< RandomGenerator, Integer > step )
```

Parameters

receiver	
receivingProbability	

5.113.2 Member Function Documentation

5.113.2.1 getReceiver()

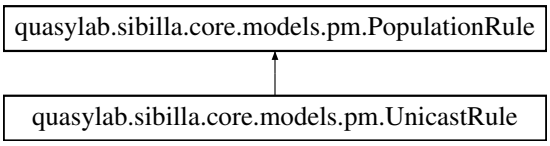
```
int quasylab.sibilla.core.models.pm.UnicastRule.UnicastReceiver.getReceiver ( )
```

Returns

the receiver

5.114 quasylab.sibilla.core.models.pm.UnicastRule Class Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.UnicastRule:



Classes

- class UnicastReceiver

Public Member Functions

- UnicastRule (String name, Function< PopulationState, Double > rateFunction, int senderIndex, Function< RandomGenerator, Integer > step, UnicastReceiver ... receivers)
- boolean isEnabled (PopulationState state)
- PopulationTransition apply (RandomGenerator r, double t, PopulationState state)

Static Public Member Functions

- static Update getDrift (String name, RandomGenerator r, int sender, PopulationState state, Function< RandomGenerator, Integer > step, UnicastReceiver[ ] receivers)

5.114.1 Detailed Description

Author

loreti

5.114.2 Constructor & Destructor Documentation

5.114.2.1 UnicastRule()

```
quasylab.sibilla.core.models.pm.UnicastRule.UnicastRule (
            String name,
            Function< PopulationState, Double > rateFunction,
            int senderIndex,
            Function< RandomGenerator, Integer > step,
            UnicastReceiver ...  receivers )
```

Parameters

rateFunction	
senderIndex	
receivers	

5.114.3 Member Function Documentation

5.114.3.1 apply()

```
PopulationTransition quasylab.sibilla.core.models.pm.UnicastRule.apply (
            RandomGenerator r,
            double now,
            PopulationState state )
```

Parameters

r	
state	

Returns

null if the rule cannot be applied.

Implements quasylab.sibilla.core.models.pm.PopulationRule.

5.114.3.2 getDrift()

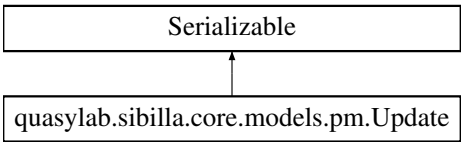
```
static Update quasylab.sibilla.core.models.pm.UnicastRule.getDrift (
            String name,
            RandomGenerator r,
            int sender,
            PopulationState state,
            Function< RandomGenerator, Integer > step,
            UnicastReceiver[] receivers )  [static]
```

5.114.3.3 isEnabled()

```
boolean quasylab.sibilla.core.models.pm.UnicastRule.isEnabled (
            PopulationState state )
```

5.115 quasylab.sibilla.core.models.pm.Update Class Reference

Inheritance diagram for quasylab.sibilla.core.models.pm.Update:



Public Member Functions

- Update (String name)
- Set< Entry< Integer, Integer > > getUpdate ()
- synchronized void add (int idx, int c, int p)
- int get (int i)
- void consume (int idx, int c)
- void produce (int idx, int p)
- String toString ()

5.115.1 Detailed Description

Author

loreti

5.115.2 Constructor & Destructor Documentation

5.115.2.1 Update()

```
quasylab.sibilla.core.models.pm.Update.Update (
            String name )
```

5.115.3 Member Function Documentation

5.115.3.1 add()

```
synchronized void quasylab.sibilla.core.models.pm.Update.add (
            int idx,
            int c,
            int p )
```

5.115.3.2 consume()

```
void quasylab.sibilla.core.models.pm.Update.consume (
            int idx,
            int c )
```

5.115.3.3 get()

```
int quasylab.sibilla.core.models.pm.Update.get (
            int i )
```

5.115.3.4 getUpdate()

```
Set<Entry<Integer, Integer> > quasylab.sibilla.core.models.pm.Update.getUpdate ( )
```

5.115.3.5 produce()

```
void quasylab.sibilla.core.models.pm.Update.produce (
            int idx,
            int p )
```

5.115.3.6 toString()

```
String quasylab.sibilla.core.models.pm.Update.toString ( )
```

5.116 quasylab.sibilla.core.markov.VectorState< S > Class Template Reference

Public Member Functions

- VectorState (IntFunction< S[]> generator, int size, IntFunction< S > init)
- int size ()
- VectorState< S > apply (BiFunction< Integer, S, S > update)
- S get (int i)
- int hashCode ()
- boolean equals (Object obj)
- String toString ()

5.116.1 Detailed Description

Author

loreti

5.116.2 Constructor & Destructor Documentation

5.116.2.1 VectorState()

```
quasylab.sibilla.core.markov.VectorState< S >.VectorState (
            IntFunction< S[]> generator,
            int size,
            IntFunction< S > init )
```

5.116.3 Member Function Documentation

5.116.3.1 apply()

```
VectorState<S> quasylab.sibilla.core.markov.VectorState< S >.apply (
            BiFunction< Integer, S, S > update )
```

5.116.3.2 equals()

```
boolean quasylab.sibilla.core.markov.VectorState< S >.equals (
            Object obj )
```

5.116.3.3 get()

```
S quasylab.sibilla.core.markov.VectorState< S >.get (
            int i )
```

5.116.3.4 hashCode()

```
int quasylab.sibilla.core.markov.VectorState< S >.hashCode ( )
```

5.116.3.5 size()

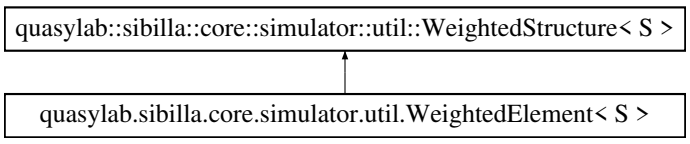
```
int quasylab.sibilla.core.markov.VectorState< S >.size ( )
```

5.116.3.6 toString()

```
String quasylab.sibilla.core.markov.VectorState< S >.toString ( )
```

5.117 quasylab.sibilla.core.simulator.util.WeightedElement< S > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.util.WeightedElement< S >:



Public Member Functions

- WeightedElement (double w, S s)
- double getWeight ()
- S getElement ()
- WeightedElement< S > residual (double w)
- double getTotalWeight ()
- WeightedElement< S > select (double w)
- WeightedStructure< S > add (double w, S s)
- WeightedStructure< S > add (WeightedStructure< S > s)
- String toString ()
- List< WeightedElement< S > > getAll ()

5.117.1 Detailed Description

Author

loreti

5.117.2 Constructor & Destructor Documentation

5.117.2.1 WeightedElement()

```
quasylab.sibilla.core.simulator.util.WeightedElement< S >.WeightedElement (
            double w,
            S s )
```

5.117.3 Member Function Documentation

5.117.3.1 add() [1/2]

```
WeightedStructure<S> quasylab.sibilla.core.simulator.util.WeightedElement< S >.add (
            double w,
            S s )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.117.3.2 add() [2/2]

```
WeightedStructure<S> quasylab.sibilla.core.simulator.util.WeightedElement< S >.add (
            WeightedStructure< S > s )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.117.3.3 getAll()

```
List<WeightedElement<S> > quasylab.sibilla.core.simulator.util.WeightedElement< S >.getAll (
)
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.117.3.4 getElement()

```
S quasylab.sibilla.core.simulator.util.WeightedElement< S >.getElement ( )
```

5.117.3.5 getTotalWeight()

```
double quasylab.sibilla.core.simulator.util.WeightedElement< S >.getTotalWeight ( )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.117.3.6 getWeight()

```
double quasylab.sibilla.core.simulator.util.WeightedElement< S >.getWeight ( )
```

5.117.3.7 residual()

```
WeightedElement<S> quasylab.sibilla.core.simulator.util.WeightedElement< S >.residual (
            double w )
```

5.117.3.8 select()

```
WeightedElement<S> quasylab.sibilla.core.simulator.util.WeightedElement< S >.select (
            double w )
```

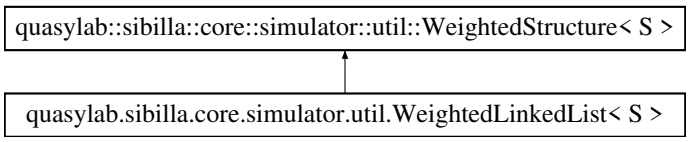
Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.117.3.9 toString()

```
String quasylab.sibilla.core.simulator.util.WeightedElement< S >.toString ( )
```

5.118 quasylab.sibilla.core.simulator.util.WeightedLinkedList< S > Class Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >:



Public Member Functions

- WeightedLinkedList ()
- double getTotalWeight ()
- WeightedElement< S > select (double w)
- WeightedStructure< S > add (double w, S s)
- WeightedStructure< S > add (WeightedElement< S > we)
- WeightedStructure< S > add (WeightedStructure< S > s)
- List< WeightedElement< S > > getAll ()

5.118.1 Detailed Description

Author

loreti

5.118.2 Constructor & Destructor Documentation

5.118.2.1 WeightedLinkedList()

```
quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >.WeightedLinkedList ( )
```

5.118.3 Member Function Documentation

5.118.3.1 add() [1/3]

```
WeightedStructure<S> quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >.add (
            double w,
            S s )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.118.3.2 add() [2/3]

```
WeightedStructure<S> quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >.add (
            WeightedElement< S > we )
```

5.118.3.3 add() [3/3]

```
WeightedStructure<S> quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >.add (
            WeightedStructure< S > s )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.118.3.4 getAll()

```
List<WeightedElement<S> > quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >.get↩
All ( )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.118.3.5 getTotalWeight()

```
double quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >.getTotalWeight ( )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

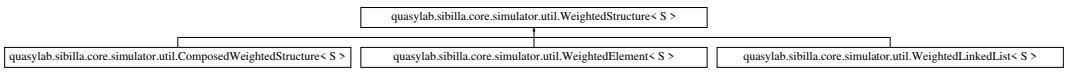
5.118.3.6 select()

```
WeightedElement<S> quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >.select (
            double w )
```

Implements quasylab.sibilla.core.simulator.util.WeightedStructure< S >.

5.119 quasylab.sibilla.core.simulator.util.WeightedStructure< S > Interface Template Reference

Inheritance diagram for quasylab.sibilla.core.simulator.util.WeightedStructure< S >:



Public Member Functions

- double getTotalWeight ()
- WeightedElement< S > select (double w)
- WeightedStructure< S > add (double w, S s)
- WeightedStructure< S > add (WeightedStructure< S > s)
- List< WeightedElement< S > > getAll ()

5.119.1 Detailed Description

Author

loreti

5.119.2 Member Function Documentation

5.119.2.1 add() [1/2]

```
WeightedStructure<S> quasylab.sibilla.core.simulator.util.WeightedStructure< S >.add (
            double w,
            S s )
```

Implemented in quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >, quasylab.sibilla.core.simulator.util.WeightedElement< S
and quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.

5.119.2.2 add() [2/2]

```
WeightedStructure<S> quasylab.sibilla.core.simulator.util.WeightedStructure< S >.add (
            WeightedStructure< S > s )
```

Implemented in quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >, quasylab.sibilla.core.simulator.util.WeightedElement< S
and quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.

5.119.2.3 getAll()

```
List<WeightedElement<S> > quasylab.sibilla.core.simulator.util.WeightedStructure< S >.getAll
( )
```

Implemented in quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >, quasylab.sibilla.core.simulator.util.WeightedElement< S
and quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.

5.119.2.4 getTotalWeight()

```
double quasylab.sibilla.core.simulator.util.WeightedStructure< S >.getTotalWeight ( )
```

Implemented in quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >, quasylab.sibilla.core.simulator.util.WeightedElement< S and quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.

5.119.2.5 select()

```
WeightedElement<S> quasylab.sibilla.core.simulator.util.WeightedStructure< S >.select (
            double w )
```

Implemented in quasylab.sibilla.core.simulator.util.WeightedLinkedList< S >, quasylab.sibilla.core.simulator.util.WeightedElement< S and quasylab.sibilla.core.simulator.util.ComposedWeightedStructure< S >.

5.120 quasylab.sibilla.core.simulator.util.Weighter< T > Interface Template Reference

Public Member Functions

- double weight (T t, int occurrences)
- double weight (T t)

5.120.1 Detailed Description

Author

loreti

5.120.2 Member Function Documentation

5.120.2.1 weight() [1/2]

```
double quasylab.sibilla.core.simulator.util.Weighter< T >.weight (
            T t )
```

5.120.2.2 weight() [2/2]

```
double quasylab.sibilla.core.simulator.util.Weighter< T >.weight (
            T t,
            int occurrences )
```

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