Documentation of FullSWOF_1D

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Chapter 1

Todo List

Class Boundary_condition

Add time dependancy in the boundary conditions.

Improve boundary conditions at the second order for the wall and periodic conditions.

Take into account source terms (friction and topography) in the boundary conditions, see Le Roux [2001], Bristeau and Coussin [2001].

Member Choice_friction::set_c (SCALAR)

For future evolutions: Friction::set_c will not be necessary when the friction coefficient will be read as in 2D.

Member F_HLL::calc (SCALAR, SCALAR, SCALAR, SCALAR)

Check if the use of long double should be generalized to other fluxes.

Member Fr_Darcy_Weisbach::calc (SCALAR, SCALAR, SCALAR)

For future evolutions: the friction coefficient shoud be added as in 2D as a parameter of Fr_Darcy_↩ Weisbach::calc.

Member Fr_Laminar::calc (SCALAR, SCALAR, SCALAR)

For future evolutions: the friction coefficient shoud be added as in 2D as a parameter of Fr_Laminar::calc.

Member Fr_Manning::calc (SCALAR, SCALAR, SCALAR)

For future evolutions: the friction coefficient shoud be added as in 2D as a parameter of Fr_Manning::calc.

Member Friction::set_c (SCALAR)

For future evolutions: Friction::set_c will not be necessary when the friction coefficient will be read as in 2D.

Member MUSCL::calc (VECT, VECT, VECT, VECT &, VECT &, VECT &, VECT &, VECT &, VECT &)

Check if the use of long double should be generalized to other reconstructions.

Member No_Friction::calc (SCALAR, SCALAR, SCALAR)

For future evolutions: the friction coefficient shoud be added as in 2D as a parameter of Fr_Manning::calc.

Member Scheme::maincalc (VECT, VECT, SCALAR, VECT &, VECT &, VECT &, SCALAR &, SCALAR &, VECT &)

Improve the treatment of numerical errors.

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3.1 Class List

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Chapter 5

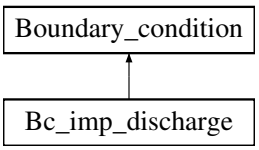
Class Documentation

5.1 Bc_imp_discharge Class Reference

Imposed discharge.

`#include <bc_imp_discharge.hpp>`

Inheritance diagram for Bc_imp_discharge:



Public Member Functions

- Bc_imp_discharge (Parameters &, VECT &, int)
  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, int)
  Calculates the boundary condition.
- SCALAR NewtonSolver (const SCALAR, const SCALAR, const SCALAR, const SCALAR, int) const
  Solves the equation with Newton iterative method.
- SCALAR ValPoly (const SCALAR, const SCALAR, const SCALAR, const SCALAR, int) const
  Gives the value of the function that must vanish.
- SCALAR ValDerPoly (const SCALAR, const SCALAR, const SCALAR, int) const
  Gives the value of the derivative of the function that must vanish.
- virtual ~Bc_imp_discharge ()
  Destructor.

Additional Inherited Members

5.1.1 Detailed Description

Imposed discharge.

Class that computes the boundary condition where the discharge is imposed. For supercritical flows, the water height is imposed too.

Definition at line 72 of file bc_imp_discharge.hpp.

5.1.2 Constructor & Destructor Documentation

Bc_imp_discharge::Bc_imp_discharge (Parameters & *par,* VECT & *z,* int *normal*)

Constructor.

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.
in,out	*z*	vector that represents the topography with suitable values on the fictive cells.

Definition at line 60 of file bc_imp_discharge.cpp.

Bc_imp_discharge::~Bc_imp_discharge ( ) [virtual]

Destructor.

Definition at line 209 of file bc_imp_discharge.cpp.

5.1.3 Member Function Documentation

void Bc_imp_discharge::calc (SCALAR *hin,* SCALAR *uin,* SCALAR *hfix,* SCALAR *qfix,* SCALAR *hin_oppbound,* SCALAR *uin_oppbound,* SCALAR *time,* int *normal*) [virtual]

Calculates the boundary condition.

Two cases are considered: subcritical and supercritical flows.

Parameters

in	*hin*	water height of the first cell inside the domain.
in	*uin*	velocity of the first cell inside the domain.
in	*hfix*	fixed (imposed) value of the water height (only for the supercritical case).
in	*qfix*	fixed (imposed) value of the discharge.
in	*hin_oppbound*	value of the water height of the first cell inside the domain at the opposite bound (unused).
in	*uin_oppbound*	value of the velocity of the first cell inside the domain at the opposite bound (unused).
in	*time*	current time (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.

Warning

Warning in the method Bc_imp_discharge::calc() The water height at the inflow is zero ... continuing!

Modifies

Boundary_condition::hbound water height on the fictive cell.
Boundary_condition::ubound velocity on the fictive cell.

Implements Boundary_condition.

Definition at line 86 of file bc_imp_discharge.cpp.

SCALAR Bc_imp_discharge::NewtonSolver (const SCALAR *HIN,* const SCALAR *UIN,* const SCALAR *QFIX,* const SCALAR *H_INIT,* int *normal*) const

Solves the equation with Newton iterative method.

Finds the root of the polynomial function corresponding to the imposed discharge. Needs the evaluation of the function and of its derivative.

Parameters

in	*HIN*	water height of the first cell inside the domain.
in	*UIN*	velocity of the first cell inside the domain.
in	*QFIX*	fixed (imposed) value of the discharge.
in	*H_INIT*	initialization of the Newton solver.
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.

Warning

Warning: Newton bc did not converge.

Returns

h: water height that satifies Riemann invariants.

Definition at line 141 of file bc_imp_discharge.cpp.

SCALAR Bc_imp_discharge::ValDerPoly (const SCALAR *HIN*, const SCALAR *UIN*, const SCALAR *H*, int *normal*) const

Gives the value of the derivative of the function that must vanish.
Computes $3\sqrt{gH} - n(UIN + 2n\sqrt{gHIN})$ where n is the normal.

Parameters

in	*HIN*	water height of the first cell inside the domain.
in	*UIN*	velocity of the first cell inside the domain.
in	*H*	value for the variable of the polynomial function.
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.

Returns

The value of derivative of the polynomial function defined in Bc_imp_discharge::ValPoly().

Definition at line 193 of file bc_imp_discharge.cpp.

SCALAR Bc_imp_discharge::ValPoly (const SCALAR *HIN*, const SCALAR *UIN*, const SCALAR *QFIX*, const SCALAR *H*, int *normal*) const

Gives the value of the function that must vanish.
Computes $2H\sqrt{gH} - n(UIN + 2n\sqrt{gHIN})H - |QFIX|$ where n is the normal.

Parameters

in	*HIN*	water height of the first cell inside the domain.
in	*UIN*	velocity of the first cell inside the domain.
in	*QFIX*	fixed (imposed) value of the discharge.
in	*H*	value for the variable of the polynomial function.
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.

Returns

The value of the polynomial function.

Definition at line 177 of file bc_imp_discharge.cpp.
The documentation for this class was generated from the following files:

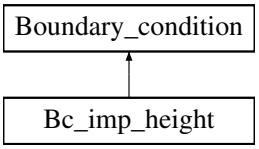
- Headers/libboundaryconditions/bc_imp_discharge.hpp
- Sources/libboundaryconditions/bc_imp_discharge.cpp

5.2 Bc_imp_height Class Reference

Imposed water height.

`#include <bc_imp_height.hpp>`

Inheritance diagram for Bc_imp_height:



Public Member Functions

- Bc_imp_height (Parameters &, VECT &, int)

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, int)

  Calculates the boundary condition.
- virtual ∼Bc_imp_height ()

  Destructor.

Additional Inherited Members

5.2.1 Detailed Description

Imposed water height.

Class that computes the boundary condition where the water height is imposed, thanks to the modified method of characteristics. For supercritical flows, the discharge is imposed too.

Definition at line 76 of file bc_imp_height.hpp.

5.2.2 Constructor & Destructor Documentation

Bc_imp_height::Bc_imp_height (Parameters & *par,* VECT & *z,* int *normal*)

Constructor.

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.
in,out	*z*	vector that represents the topography with suitable values on the fictive cells.

Definition at line 62 of file bc_imp_height.cpp.

Bc_imp_height::∼Bc_imp_height ( ) `[virtual]`

Destructor.

Definition at line 142 of file bc_imp_height.cpp.

5.2.3 Member Function Documentation

void Bc_imp_height::calc (SCALAR *hin,* SCALAR *uin,* SCALAR *hfix,* SCALAR *qfix,* SCALAR *hin_oppbound,* SCALAR *uin_oppbound,* SCALAR *time,* int *normal*) `[virtual]`

Calculates the boundary condition.

Two cases are considered: subcritical and supercritical flows. In each case, the values to be imposed depend on the flow (inflow or outflow).

Parameters

in	*hin*	water height of the first cell inside the domain.
in	*uin*	velocity of the first cell inside the domain.
in	*hfix*	fixed (imposed) value of the water height.
in	*qfix*	fixed (imposed) value of the discharge.
in	*hin_oppbound*	value of the water height of the first cell inside the domain at the opposite bound (unused).
in	*uin_oppbound*	value of the velocity of the first cell inside the domain at the opposite bound (unused).
in	*time*	current time (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.

Modifies

Boundary_condition::hbound water height on the fictive cell.
Boundary_condition::ubound velocity on the fictive cell.

Implements Boundary_condition.
Definition at line 84 of file bc_imp_height.cpp.
The documentation for this class was generated from the following files:

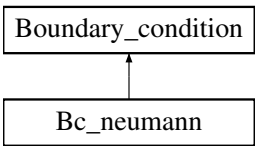
- Headers/libboundaryconditions/bc_imp_height.hpp
- Sources/libboundaryconditions/bc_imp_height.cpp

5.3 Bc_neumann Class Reference

Neumann condition.

`#include <bc_neumann.hpp>`

Inheritance diagram for Bc_neumann:



Public Member Functions

- Bc_neumann (Parameters &, VECT &, int)

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, int)

  Calculates the boundary condition.
- virtual ~Bc_neumann ()

  Destructor.

Additional Inherited Members

5.3.1 Detailed Description

Neumann condition.

Class that computes the boundary condition with Neumann condition (the normal derivative is null).
Definition at line 71 of file bc_neumann.hpp.

5.3.2 Constructor & Destructor Documentation

Bc_neumann::Bc_neumann (Parameters & *par,* VECT & *z,* int *normal*)

Constructor.

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.
in,out	*z*	vector that represents the topography with suitable values on the fictive cells.

Definition at line 59 of file bc_neumann.cpp.

Bc_neumann::~Bc_neumann ( ) [virtual]

Destructor.

Definition at line 109 of file bc_neumann.cpp.

5.3.3 Member Function Documentation

void Bc_neumann::calc (SCALAR *hin*, SCALAR *uin*, SCALAR *hfix*, SCALAR *qfix*, SCALAR *hin_oppbound*, SCALAR *uin_oppbound*, SCALAR *time*, int *normal*) [virtual]

Calculates the boundary condition.

Parameters

in	*hin*	water height of the first cell inside the domain.
in	*uin*	velocity of the first cell inside the domain.
in	*hfix*	fixed (imposed) value of the water height (unused).
in	*qfix*	fixed (imposed) value of the discharge (unused).
in	*hin_oppbound*	value of the water height of the first cell inside the domain at the opposite bound (unused).
in	*uin_oppbound*	value of the velocity of the first cell inside the domain at the opposite bound (unused).
in	*time*	current time (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary (unused).

Modifies

Boundary_condition::hbound water height on the fictive cell.
Boundary_condition::ubound velocity on the fictive cell.

Implements Boundary_condition.

Definition at line 81 of file bc_neumann.cpp.

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

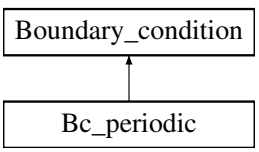
- Headers/libboundaryconditions/bc_neumann.hpp
- Sources/libboundaryconditions/bc_neumann.cpp

5.4 Bc_periodic Class Reference

Periodic condition.

`#include <bc_periodic.hpp>`

Inheritance diagram for Bc_periodic:



Public Member Functions

- Bc_periodic (Parameters &, VECT &, int)

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, int)

  Calculates boundary condition.
- virtual ∼Bc_periodic ()

  Destructor.

Additional Inherited Members

5.4.1 Detailed Description

Periodic condition.

Class that computes the periodic boundary condition

Definition at line 71 of file bc_periodic.hpp.

5.4.2 Constructor & Destructor Documentation

Bc_periodic::Bc_periodic (Parameters & *par,* VECT & *z,* int *normal*)

Constructor.

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.
in,out	*z*	vector that represents the topography with suitable values on the fictive cells.

Definition at line 59 of file bc_periodic.cpp.

Bc_periodic::∼Bc_periodic ( ) [virtual]

Destructor.

Definition at line 111 of file bc_periodic.cpp.

5.4.3 Member Function Documentation

void Bc_periodic::calc (SCALAR *hin,* SCALAR *uin,* SCALAR *hfix,* SCALAR *qfix,* SCALAR *hin_oppbound,* SCALAR *uin_oppbound,* SCALAR *time,* int *normal*) [virtual]

Calculates boundary condition.

The velocity and water height are fixed to have the same behavior at each bound of the domain.

Parameters

in	*hin*	water height of the first cell inside the domain (unused).
in	*uin*	velocity of the first cell inside the domain (unused).
in	*hfix*	fixed (imposed) value of the water height (unused).
in	*qfix*	fixed (imposed) value of the discharge (unused).
in	*hin_oppbound*	value of the water height of the first cell inside the domain at the opposite bound.
in	*uin_oppbound*	value of the velocity of the first cell inside the domain at the opposite bound.

in	*time*	current time (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary (unused).

Modifies

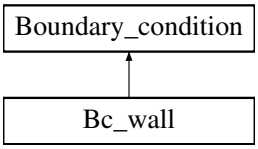
Boundary_condition::hbound water height on the fictive cell.
Boundary_condition::ubound velocity on the fictive cell.

Implements Boundary_condition.
Definition at line 82 of file bc_periodic.cpp.
The documentation for this class was generated from the following files:

- Headers/libboundaryconditions/bc_periodic.hpp
- Sources/libboundaryconditions/bc_periodic.cpp

5.5 Bc_wall Class Reference

Wall condition.
`#include <bc_wall.hpp>`
Inheritance diagram for Bc_wall:



Public Member Functions

- Bc_wall (Parameters &, VECT &, int)
  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, int)
  Calculates the boundary condition.
- virtual ~Bc_wall ()
  Destructor.

Additional Inherited Members

5.5.1 Detailed Description

Wall condition.
Class that computes the wall boundary condition.
Definition at line 71 of file bc_wall.hpp.

5.5.2 Constructor & Destructor Documentation

Bc_wall::Bc_wall (Parameters & *par,* VECT & *z,* int *normal*)

Constructor.
Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.
in,out	*z*	vector that represents the topography with suitable values on the fictive cells.

Definition at line 59 of file bc_wall.cpp.

Bc_wall::~Bc_wall ( ) [virtual]

Destructor.

Definition at line 110 of file bc_wall.cpp.

5.5.3 Member Function Documentation

void Bc_wall::calc (SCALAR *hin*, SCALAR *uin*, SCALAR *hfix*, SCALAR *qfix*, SCALAR *hin_oppbound*, SCALAR *uin_oppbound*, SCALAR *time*, int *normal*) [virtual]

Calculates the boundary condition.

The water height (on the fictive cell) is the same as inside the domain and the velocity is the opposite. This gives a null discharge at the boundary.

Parameters

in	*hin*	water height of the first cell inside the domain.
in	*uin*	velocity of the first cell inside the domain.
in	*hfix*	fixed (imposed) value of the water height (only for the supercritical case) (unused).
in	*qfix*	fixed (imposed) value of the discharge (unused).
in	*hin_oppbound*	value of the water height of the first cell inside the domain at the opposite bound (unused).
in	*uin_oppbound*	value of the velocity of the first cell inside the domain at the opposite bound (unused).
in	*time*	current time (unused).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary (unused).

Modifies

Boundary_condition::hbound water height on the fictive cell.
Boundary_condition::ubound velocity on the fictive cell.

Implements Boundary_condition.

Definition at line 80 of file bc_wall.cpp.

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

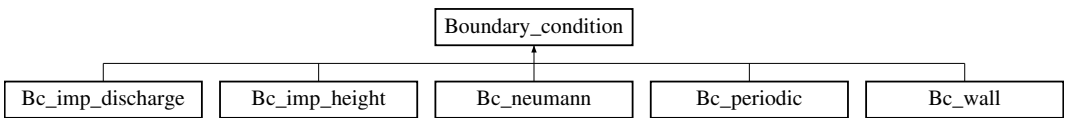
- Headers/libboundaryconditions/bc_wall.hpp
- Sources/libboundaryconditions/bc_wall.cpp

5.6 Boundary_condition Class Reference

Boundary condition.

`#include <boundary_condition.hpp>`

Inheritance diagram for Boundary_condition:



Public Member Functions

- Boundary_condition (Parameters &)

  Constructor.
- virtual void calc (SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, int)=0

  Function to be specified in each boundary condition.
- SCALAR get_hbound () const

  Gives the water height on the fictive cell.
- SCALAR get_ubound () const

  Gives the velocity of the flow on the fictive cell.
- virtual ∼Boundary_condition ()

  Destructor.

Protected Attributes

- SCALAR hbound
- SCALAR ubound
- SCALAR ufix
- const int NXCELL

5.6.1 Detailed Description

Boundary condition.

Class that contains all the common declarations for the boundary conditions.

Todo Add time dependancy in the boundary conditions.

Improve boundary conditions at the second order for the wall and periodic conditions.

Take into account source terms (friction and topography) in the boundary conditions, see Le Roux [2001], Bristeau and Coussin [2001].

Definition at line 72 of file boundary_condition.hpp.

5.6.2 Constructor & Destructor Documentation

Boundary_condition::Boundary_condition (Parameters & *par*)

Constructor.

Defines the number of cells.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 58 of file boundary_condition.cpp.

Boundary_condition::∼Boundary_condition ( ) [virtual]

Destructor.

Definition at line 87 of file boundary_condition.cpp.

5.6.3 Member Function Documentation

virtual void Boundary_condition::calc (SCALAR , SCALAR , SCALAR , SCALAR , SCALAR , SCALAR , SCALAR , int) [pure virtual]

Function to be specified in each boundary condition.

Implemented in Bc_imp_height, Bc_imp_discharge, Bc_neumann, Bc_periodic, and Bc_wall.

SCALAR Boundary_condition::get_hbound ( ) const

Gives the water height on the fictive cell.

Returns

Boundary_condition::hbound water height on the fictive cell.

Definition at line 67 of file boundary_condition.cpp.

SCALAR Boundary_condition::get_ubound ( ) const

Gives the velocity of the flow on the fictive cell.

Returns

Boundary_condition::ubound velocity on the fictive cell.

Definition at line 77 of file boundary_condition.cpp.

5.6.4 Member Data Documentation

SCALAR Boundary_condition::hbound [protected]

Water height on the fictive cell, to be specified in each boundary condition.
Definition at line 94 of file boundary_condition.hpp.

const int Boundary_condition::NXCELL [protected]

Number of cells (in space).
Definition at line 100 of file boundary_condition.hpp.

SCALAR Boundary_condition::ubound [protected]

Velocity on the fictive cell, to be specified in each boundary condition.
Definition at line 96 of file boundary_condition.hpp.

SCALAR Boundary_condition::ufix [protected]

Imposed value of the velocity from Parameters::L_imp_q (or Parameters::R_imp_q) and Parameters::L_imp_h (or Parameters::R_imp_h).
Definition at line 98 of file boundary_condition.hpp.
The documentation for this class was generated from the following files:

- Headers/libboundaryconditions/boundary_condition.hpp
- Sources/libboundaryconditions/boundary_condition.cpp

5.7 Choice_condition Class Reference

Choice of boundary condition.

```
#include <choice_condition.hpp>
```

Public Member Functions

- Choice_condition (int, Parameters &, VECT &, int)

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR, int)

  Calculates the boundary condition.
- SCALAR get_hbound ()

  Gives the water height on the fictive cell.
- SCALAR get_ubound ()

  Gives the velocity of the flow on the fictive cell.
- virtual ∼Choice_condition ()

  Destructor.

5.7.1 Detailed Description

Choice of boundary condition.

Class that calls the boundary condition chosen in the parameters file.

Definition at line 90 of file choice_condition.hpp.

5.7.2 Constructor & Destructor Documentation

Choice_condition::Choice_condition (int *choice,* Parameters & *par,* VECT & *z,* int *normal*)

Constructor.

Defines the boundary condition from the value given in the parameters file.

Parameters

in	*choice*	integer that correspond to the chosen boundary condition.
in	*par*	parameter, contains all the values from the parameters file.
in	*z*	vector that represents the topography.
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.

Definition at line 59 of file choice_condition.cpp.

Choice_condition::∼Choice_condition ( ) [virtual]

Destructor.

Definition at line 129 of file choice_condition.cpp.

5.7.3 Member Function Documentation

void Choice_condition::calc (SCALAR *hin,* SCALAR *uin,* SCALAR *hfix,* SCALAR *qfix,* SCALAR *hin_oppbound,* SCALAR *uin_oppbound,* SCALAR *time,* int *normal*)

Calculates the boundary condition.

Calls the calculation of the boundary condition.

Parameters

in	*hin*	water height of the first cell inside the domain.
in	*uin*	velocity of the first cell inside the domain.
in	*hfix*	fixed (imposed) value of the water height.

in	*qfix*	fixed (imposed) value of the discharge.
in	*hin_oppbound*	value of the water height of the first cell inside the domain at the opposite bound.
in	*uin_oppbound*	value of the velocity of the first cell inside the domain at the opposite bound.
in	*time*	current time (unused, for the moment).
in	*normal*	integer to specify whether it is the left (-1) or the right (1) boundary.

Definition at line 89 of file choice_condition.cpp.

SCALAR Choice_condition::get_hbound ( )

Gives the water height on the fictive cell.

Calls the function to get the water height on the fictive cell.

Returns

Boundary_condition::hbound water height on the fictive cell for the chosen boundary condition.

Definition at line 107 of file choice_condition.cpp.

SCALAR Choice_condition::get_ubound ( )

Gives the velocity of the flow on the fictive cell.

Calls the function to get the velocity on the fictive cell.

Returns

Boundary_condition::ubound velocity on the fictive cell for the chosen boundary condition.

Definition at line 118 of file choice_condition.cpp.

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

- Headers/libboundaryconditions/choice_condition.hpp
- Sources/libboundaryconditions/choice_condition.cpp

5.8 Choice_flux Class Reference

Choice of numerical flux.

`#include <choice_flux.hpp>`

Public Member Functions

- Choice_flux (int)

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR)

  Calculates the numerical flux.
- void set_tx (SCALAR)

  Sets the variable Flux::tx.
- SCALAR get_f1 ()

  Gives the first component of the numerical flux.
- SCALAR get_f2 ()

  Gives the second component of the numerical flux.
- SCALAR get_cfl ()

  Gives the CFL value.
- virtual ~Choice_flux ()

  Destructor.

5.8.1 Detailed Description

Choice of numerical flux.

Class that calls the numerical flux chosen in the parameters file.

Definition at line 92 of file choice_flux.hpp.

5.8.2 Constructor & Destructor Documentation

Choice_flux::Choice_flux (int *choice*)

Constructor.

Defines the numerical flux from the value given in the parameters file.

Parameters

in	*choice*	integer that correspond to the chosen numerical flux.

Definition at line 59 of file choice_flux.cpp.

Choice_flux::~Choice_flux ( ) [virtual]

Destructor.

Definition at line 144 of file choice_flux.cpp.

5.8.3 Member Function Documentation

void Choice_flux::calc (SCALAR *h_L*, SCALAR *u_L*, SCALAR *h_R*, SCALAR *u_R*)

Calculates the numerical flux.

Calls the calculation of the numerical flux.

Parameters

in	*h_L*	water height at the left of the interface where the flux is calculated.
in	*u_L*	velocity at the left of the interface where the flux is calculated.
in	*h_R*	water height at the right of the interface where the flux is calculated.
in	*u_R*	velocity at the right of the interface where the flux is calculated.

Definition at line 86 of file choice_flux.cpp.

SCALAR Choice_flux::get_cfl ( )

Gives the CFL value.

Calls the function to get the value of the CFL.

Returns

Flux::cfl value of the CFL.

Definition at line 133 of file choice_flux.cpp.

SCALAR Choice_flux::get_f1 ( )

Gives the first component of the numerical flux.

Calls the function to get the first componant of the numerical flux.

Returns

Flux::f1 first componant of the numerical flux.

Definition at line 111 of file choice_flux.cpp.

SCALAR Choice_flux::get_f2 ( )

Gives the second component of the numerical flux.

Calls the function to get the second componant of the numerical flux.

Returns

Flux::f2 second componant of the numerical flux.

Definition at line 122 of file choice_flux.cpp.

void Choice_flux::set_tx (SCALAR *tx*)

Sets the variable Flux::tx.

Calls the setting of the value given in parameter to the variable ***tx***.

Parameters

in	*tx*	value of dt/dx.

Definition at line 100 of file choice_flux.cpp.

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

- Headers/libflux/choice_flux.hpp
- Sources/libflux/choice_flux.cpp

5.9 Choice_friction Class Reference

Choice of friction law.

`#include <choice_friction.hpp>`

Public Member Functions

- Choice_friction (int)

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR)

  Calculates the friction term.
- SCALAR get_qmod ()

  Gives the discharge modified by the friction term.
- void set_c (SCALAR)

  Sets the variable Friction::c.
- void set_dt (SCALAR)

  Sets the variable Friction::dt.
- virtual ~Choice_friction ()

  Destructor.

5.9.1 Detailed Description

Choice of friction law.

Class that calls the fricition law chosen in the parameters file.

Definition at line 86 of file choice_friction.hpp.

5.9.2 Constructor & Destructor Documentation

Choice_friction::Choice_friction (int *choice*)

Constructor.

Defines the friction law from the value given in the parameters file.

Parameters

in	*choice*	integer that correspond to the chosen friction law.

Definition at line 59 of file choice_friction.cpp.

Choice_friction::~Choice_friction ( ) [virtual]

Destructor.

Definition at line 135 of file choice_friction.cpp.

5.9.3 Member Function Documentation

void Choice_friction::calc (SCALAR *uold,* SCALAR *hnew,* SCALAR *qnew*)

Calculates the friction term.

Calls the calculation of the friction law.

Parameters

in	*uold*	velocity at the previous time (n if you are calculating the $n+1$th time step).
in	*hnew*	water height after the Shallow-Water computation (without friction).
in	*qnew*	discharge after the Shallow-Water computation (without friction).

Note

The friction only affects the discharge.

Definition at line 87 of file choice_friction.cpp.

SCALAR Choice_friction::get_qmod ( )

Gives the discharge modified by the friction term.

Calls the function to get the discharge modified by the friction term.

Returns

Friction::qmod discharge modified by the friction term.

Definition at line 101 of file choice_friction.cpp.

void Choice_friction::set_c (SCALAR *c*)

Sets the variable Friction::c.

Calls the setting of the value given in parameter to the variable ***c***.

Parameters

in	*c*	value of the friction coefficient.

Todo For future evolutions: Friction::set_c will not be necessary when the friction coefficient will be read as in 2D.

Definition at line 112 of file choice_friction.cpp.

void Choice_friction::set_dt (SCALAR *dt*)

Sets the variable Friction::dt.

Calls the setting of the value given in parameter to the variable ***dt***.

Parameters

in	*dt*	value of the time step.

Definition at line 124 of file choice_friction.cpp.

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

- Headers/libfrictions/choice_friction.hpp
- Sources/libfrictions/choice_friction.cpp

5.10 Choice_infiltration Class Reference

Choice of infiltration law.

`#include <choice_infiltration.hpp>`

Public Member Functions

- Choice_infiltration (Parameters &)

  Constructor.
- void calc (const VECT &, const VECT &, const SCALAR)

  Performs the computation of the modified water height and the infiltrated volume.
- virtual ∼Choice_infiltration ()

  Destructor.
- VECT get_hmod ()

  Gives the value of the modified water height.
- VECT get_Vin ()

  Gives the value of the infiltrated volume.

5.10.1 Detailed Description

Choice of infiltration law.

Class that calls the infiltration chosen in the parameters file.

Definition at line 80 of file choice_infiltration.hpp.

5.10.2 Constructor & Destructor Documentation

Choice_infiltration::Choice_infiltration (Parameters & *par*)

Constructor.

Defines the friction law from the value given in the parameters file.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 59 of file choice_infiltration.cpp.

Choice_infiltration::∼Choice_infiltration ( ) [virtual]

Destructor.

Definition at line 109 of file choice_infiltration.cpp.

5.10.3 Member Function Documentation

void Choice_infiltration::calc (const VECT & *h,* const VECT & *Vin,* const SCALAR *dt*)

Performs the computation of the modified water height and the infiltrated volume.

Calls the computation of infiltration.

Parameters

in	*h*	water height.
in	*Vin*	infiltrated volume.
in	*dt*	time step.

Definition at line 77 of file choice_infiltration.cpp.

VECT Choice_infiltration::get_hmod ( )

Gives the value of the modified water height.

Returns

The value hmod Infiltration::hmod.

Definition at line 89 of file choice_infiltration.cpp.

VECT Choice_infiltration::get_Vin ( )

Gives the value of the infiltrated volume.

Returns

The value Vin Infiltration::Vin.

Definition at line 99 of file choice_infiltration.cpp.
The documentation for this class was generated from the following files:

- Headers/librain_infiltration/choice_infiltration.hpp
- Sources/librain_infiltration/choice_infiltration.cpp

5.11 Choice_init_hu Class Reference

Choice of initialization for h and u.

`#include <choice_init_hu.hpp>`

Public Member Functions

- Choice_init_hu (Parameters &)
  Constructor.
- void initialization (VECT &, VECT &)
  Performs the initialization.
- virtual ~Choice_init_hu ()
  Destructor.

5.11.1 Detailed Description

Choice of initialization for h and u.
Class that calls the initialization of the water height and of the velocity chosen in the parameters file.
Definition at line 96 of file choice_init_hu.hpp.

5.11.2 Constructor & Destructor Documentation

Choice_init_hu::Choice_init_hu (Parameters & *par*)

Constructor.
Defines the initialization of the water height and of the velocity from the value given in the parameters file.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 59 of file choice_init_hu.cpp.

Choice_init_hu::~Choice_init_hu ( ) [virtual]

Destructor.

Definition at line 103 of file choice_init_hu.cpp.

5.11.3 Member Function Documentation

void Choice_init_hu::initialization (VECT & *h*, VECT & *u*)

Performs the initialization.

Calls the initialization of the water height and of the velocity.

Parameters

in	*h*	water height.
in	*u*	velocity.

Definition at line 91 of file choice_init_hu.cpp.

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

- Headers/libinitializations/choice_init_hu.hpp
- Sources/libinitializations/choice_init_hu.cpp

5.12 Choice_init_topo Class Reference

Choice of initialization for the topography.

`#include <choice_init_topo.hpp>`

Public Member Functions

- Choice_init_topo (Parameters &)

  Constructor.
- void initialization (VECT &)

  Performs the initialization.
- virtual ~Choice_init_topo ()

  Destructor.

5.12.1 Detailed Description

Choice of initialization for the topography.

Class that calls the initialization of the topography chosen in the parameters file.

Definition at line 87 of file choice_init_topo.hpp.

5.12.2 Constructor & Destructor Documentation

Choice_init_topo::Choice_init_topo (Parameters & *par*)

Constructor.

Defines the initialization of the topography from the value given in the parameters file.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 59 of file choice_init_topo.cpp.

Choice_init_topo::~Choice_init_topo ( ) [virtual]

Destructor.

Definition at line 96 of file choice_init_topo.cpp.

5.12.3 Member Function Documentation

void Choice_init_topo::initialization (VECT & *z*)

Performs the initialization.

Calls the initialization of the topography.

Parameters

in	*z*	topography.

Definition at line 85 of file choice_init_topo.cpp.

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

- Headers/libinitializations/choice_init_topo.hpp
- Sources/libinitializations/choice_init_topo.cpp

5.13 Choice_limiter Class Reference

Choice of slope limiter.

`#include <choice_limiter.hpp>`

Public Member Functions

- Choice_limiter (int)

  Constructor.
- void calc (SCALAR, SCALAR)

  Calculates the slope limiter.
- SCALAR get_rec () const

  Gives the reconstructed value.
- virtual ~Choice_limiter ()

  Destructor.

5.13.1 Detailed Description

Choice of slope limiter.

Class that calls the slope limiter chosen in the parameters file.

Definition at line 83 of file choice_limiter.hpp.

5.13.2 Constructor & Destructor Documentation

Choice_limiter::Choice_limiter (int *choice*)

Constructor.

Defines the slope limiter from the value given in the parameters file.

Parameters

in	*choice*	integer that corresponds to the chosen slope limiter.

Definition at line 59 of file choice_limiter.cpp.

Choice_limiter::~Choice_limiter ( ) [virtual]

Destructor.

Definition at line 103 of file choice_limiter.cpp.

5.13.3 Member Function Documentation

void Choice_limiter::calc (SCALAR *a*, SCALAR *b*)

Calculates the slope limiter.

Calls the calculation of the slope limiter.

Parameters

in	*a*	slope on the left of the cell.
in	*b*	slope on the right of the cell.

Definition at line 80 of file choice_limiter.cpp.

SCALAR Choice_limiter::get_rec ( ) const

Gives the reconstructed value.

Calls the function to get the reconstructed value.

Returns

Limiter::rec reconstructed value for the chosen slope limiter.

Definition at line 92 of file choice_limiter.cpp.

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

- Headers/liblimitations/choice_limiter.hpp
- Sources/liblimitations/choice_limiter.cpp

5.14 Choice_output Class Reference

Choice of output format.

`#include <choice_output.hpp>`

Public Member Functions

- Choice_output (Parameters &)

  Constructor.
- void write (VECT, VECT, VECT, int)

  Save the current time.
- void initial (VECT, VECT, VECT)

  Saves the initial time.
- void bound_flux (int, SCALAR, SCALAR, SCALAR, SCALAR)

  Saves the flux and the cumulative flux on the boundaries.
- void check_vol (int, SCALAR, SCALAR, SCALAR, SCALAR)

  Saves the infiltrated and rain volumes.
- void result (SCALAR, clock_t, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR)

Saves global values.

- void save (VECT, VECT, VECT)

  Saves the final time.

- virtual ~Choice_output ()

  Destructor.

5.14.1 Detailed Description

Choice of output format.

From the value of the corresponding parameter, calls the savings in the chosen format.

Definition at line 74 of file choice_output.hpp.

5.14.2 Constructor & Destructor Documentation

Choice_output::Choice_output (Parameters & *par*)

Constructor.

Defines the output format from the value given in the parameters file.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 58 of file choice_output.cpp.

Choice_output::~Choice_output ( ) [virtual]

Destructor.

Definition at line 159 of file choice_output.cpp.

5.14.3 Member Function Documentation

void Choice_output::bound_flux (int *time,* SCALAR *f_l,* SCALAR *f_r,* SCALAR *cum_f_l,* SCALAR *cum_f_r*)

Saves the flux and the cumulative flux on the boundaries.

Calls the saving of the flux and the cumulative flux on the boundaries.

Parameters

in	*time*	current time (number of iterations).
in	*f_l*	flux on the left boundary.
in	*f_r*	flux on the right boundary.
in	*cum_f_l*	cumulative flux on the left boundary.
in	*cum_f_r*	cumulative flux on the right boundary.

Definition at line 100 of file choice_output.cpp.

void Choice_output::check_vol (int *time,* SCALAR *Vol_rain_tot,* SCALAR *Vol_inf_tot,* SCALAR *Vol_of_tot,* SCALAR *Vol_bound_tot*)

Saves the infiltrated and rain volumes.

Calls the saving of the infiltrated and rain volumes.

Parameters

in	*time*	current time (number of iterations).
in	*Vol_rain_tot*	total rain volume.
in	*Vol_inf_tot*	total volume of infiltrated water.
in	*Vol_of_tot*	total volume of overland flow.
in	*Vol_bound_tot*	total volume of water at the boundary.

Definition at line 115 of file choice_output.cpp.

void Choice_output::initial (VECT *z,* VECT *h,* VECT *u*)

Saves the initial time.

Calls the saving of the inital time.

Parameters

in	*h*	water height.
in	*u*	velocity.
in	*z*	topography.

Definition at line 87 of file choice_output.cpp.

void Choice_output::result (SCALAR *t,* clock_t *cpu,* SCALAR *froude,* SCALAR *Vol_rain_tot,* SCALAR *Vol_inf_tot,* SCALAR *Vol_of_tot,* SCALAR *Vol_bound_tot*)

Saves global values.

Calls the saving of the global values.

Parameters

in	*t*	elapsed time.
in	*cpu*	CPU time.
in	*froude*	mean Froude number (in space) at the final time.
in	*Vol_rain_tot*	total rain volume.
in	*Vol_inf_tot*	total volume of infiltrated water.
in	*Vol_of_tot*	total volume of overland flow.
in	*Vol_bound_tot*	total volume of water at the boundary.

Definition at line 130 of file choice_output.cpp.

void Choice_output::save (VECT *z,* VECT *h,* VECT *q*)

Saves the final time.

Calls the saving of the final time.

Parameters

in	*z*	topography.
in	*h*	water height.
in	*q*	discharge.

Definition at line 146 of file choice_output.cpp.

void Choice_output::write (VECT *h,* VECT *q,* VECT *z,* int *n*)

Save the current time.

Calls the saving of the current time.

Parameters

in	*h*	water height.
in	*q*	discharge.
in	*z*	topography.
in	*n*	index of the current time.

Definition at line 73 of file choice_output.cpp.
The documentation for this class was generated from the following files:

- Headers/libsave/choice_output.hpp
- Sources/libsave/choice_output.cpp

5.15 Choice_rain Class Reference

Choice of initialization for the rain.
`#include <choice_rain.hpp>`

Public Member Functions

- Choice_rain (Parameters &)
  Constructor.
- void rain_func (SCALAR, VECT &)
  Performs the initialization filling up the table of the rain intensity.
- virtual ∼Choice_rain ()
  Destructor.

5.15.1 Detailed Description

Choice of initialization for the rain.
Class that calls the initialization of the rain chosen in the parameters file.
Definition at line 83 of file choice_rain.hpp.

5.15.2 Constructor & Destructor Documentation

Choice_rain::Choice_rain (Parameters & *par*)

Constructor.
Defines the initialization of the rain from the value given in the parameters file.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 58 of file choice_rain.cpp.

Choice_rain::∼Choice_rain ( ) [virtual]

Destructor.
Definition at line 92 of file choice_rain.cpp.

5.15.3 Member Function Documentation

void Choice_rain::rain_func (SCALAR *time,* VECT & *Tab_rain*)

Performs the initialization filling up the table of the rain intensity.
Calls the initialization of the rain.

Parameters

in	*time*	current time.
in	*Tab_rain*	rain.

Definition at line 81 of file choice_rain.cpp.
The documentation for this class was generated from the following files:

- Headers/librain_infiltration/choice_rain.hpp
- Sources/librain_infiltration/choice_rain.cpp

5.16 Choice_reconstruction Class Reference

Choice of reconstruction.
`#include <choice_reconstruction.hpp>`

Public Member Functions

- Choice_reconstruction (Parameters &, VECT)
  Constructor.
- void calc (VECT, VECT, VECT, VECT &, VECT &, VECT &, VECT &, VECT &, VECT &)
  Calculates the second order reconstruction in space.
- virtual ∼Choice_reconstruction ()
  Destructor.

5.16.1 Detailed Description

Choice of reconstruction.
Class that calls the reconstruction chosen in the parameters file.
Definition at line 82 of file choice_reconstruction.hpp.

5.16.2 Constructor & Destructor Documentation

Choice_reconstruction::Choice_reconstruction (Parameters & *par,* VECT *z*)

Constructor.
Defines the reconstruction from the value given in the parameters file.
Parameters

in	*par*	parameter, contains all the values from the parameters file.
in	*z*	vector that represents the topography.

Definition at line 59 of file choice_reconstruction.cpp.

Choice_reconstruction::∼Choice_reconstruction ( ) [virtual]

Destructor.
Definition at line 100 of file choice_reconstruction.cpp.

5.16.3 Member Function Documentation

void Choice_reconstruction::calc (VECT *h,* VECT *u,* VECT *z,* VECT & *hr,* VECT & *hl,* VECT & *delz,* VECT & *ur,* VECT & *ul,* VECT & *dzi*)

Calculates the second order reconstruction in space.
Calls the calculation of the second order reconstruction in space.

Parameters

in	*h*	water height.
in	*u*	velocity of the flow.
in	*z*	topography.
out	*hr*	reconstructed water height on the right of the cell.
out	*hl*	reconstructed water height on the left of the cell.
out	*delz*	difference between two reconstructed topographies on the same boundary (from two adjacent cells).
out	*ur*	reconstructed velocity on the right of the cell.
out	*ul*	reconstructed velocity on the left of the cell.
out	*dzi*	difference between the reconstructed topographies on the left and on the right boundary of a cell.

Definition at line 81 of file choice_reconstruction.cpp.

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

- Headers/libreconstructions/choice_reconstruction.hpp
- Sources/libreconstructions/choice_reconstruction.cpp

5.17 Choice_scheme Class Reference

Choice of numerical scheme.

`#include <choice_scheme.hpp>`

Public Member Functions

- Choice_scheme (Parameters &)

  Constructor.
- void calc ()

  Performs the scheme.
- virtual ~Choice_scheme ()

  Destructor.

5.17.1 Detailed Description

Choice of numerical scheme.

Class that calls the numerical scheme chosen in the parameters file.

Definition at line 78 of file choice_scheme.hpp.

5.17.2 Constructor & Destructor Documentation

Choice_scheme::Choice_scheme (Parameters & *par*)

Constructor.

Defines the numerical scheme from the value given in the parameters file.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 59 of file choice_scheme.cpp.

Choice_scheme::~Choice_scheme ( ) [virtual]

Destructor.

Definition at line 88 of file choice_scheme.cpp.

5.17.3 Member Function Documentation

void Choice_scheme::calc ( )

Performs the scheme.

Calls the computation of the solution.

Definition at line 77 of file choice_scheme.cpp.

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

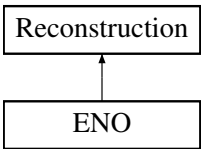
- Headers/libschemes/choice_scheme.hpp
- Sources/libschemes/choice_scheme.cpp

5.18 ENO Class Reference

ENO recontruction

`#include <eno.hpp>`

Inheritance diagram for ENO:



Public Member Functions

- ENO (Parameters &, VECT)

  Constructor.
- void calc (VECT, VECT, VECT, VECT &, VECT &, VECT &, VECT &, VECT &, VECT &)

  Calculates the reconstruction in space.
- ∼ENO ()

  Destructor.

Additional Inherited Members

5.18.1 Detailed Description

ENO recontruction

Class that computes ENO reconstruction in space.

Definition at line 69 of file eno.hpp.

5.18.2 Constructor & Destructor Documentation

ENO::ENO (Parameters & *par,* VECT *z*)

Constructor.

Initializations.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

in	*z*	topography.

Warning

Problem: allocation of som_z failed.

Note

If som_z cannot be allocated, the code will exit with failure termination code.

Definition at line 59 of file eno.cpp.

ENO::∼ENO ( )

Destructor.

Definition at line 200 of file eno.cpp.

5.18.3 Member Function Documentation

void ENO::calc (VECT *h,* VECT *u,* VECT *z,* VECT & *hr,* VECT & *hl,* VECT & *delz,* VECT & *ur,* VECT & *ul,* VECT & *dzi*) [virtual]

Calculates the reconstruction in space.

Calls the calculation of the second order reconstruction in space with ENO formulation, see Harten et al. [1986], Harten et al. [1987], Shu and Osher [1988], Bouchut [2004], Bouchut [2007].

Parameters

in	*h*	water height.
in	*u*	velocity of the flow.
in	*z*	topography.
out	*hr*	reconstructed water height on the right of the cell.
out	*hl*	reconstructed water height on the left of the cell.
out	*delz*	difference between two reconstructed topographies on the same boundary (from two adjacent cells).
out	*ur*	reconstructed velocity on the right of the cell.
out	*ul*	reconstructed velocity on the left of the cell.
out	*dzi*	difference between the reconstructed topographies on the left and on the right boundary of a cell.

Implements Reconstruction.

Definition at line 82 of file eno.cpp.

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

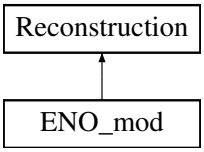
- Headers/libreconstructions/eno.hpp
- Sources/libreconstructions/eno.cpp

5.19 ENO_mod Class Reference

Modified ENO recontruction.

`#include <eno_mod.hpp>`

Inheritance diagram for ENO_mod:



Public Member Functions

- ENO_mod (Parameters &, VECT)

  Constructor.
- void calc (VECT, VECT, VECT, VECT &, VECT &, VECT &, VECT &, VECT &, VECT &)

  Calculates the reconstruction in space.
- ∼ENO_mod ()

  Destructor.

Additional Inherited Members

5.19.1 Detailed Description

Modified ENO recontruction.

Class that computes the modified ENO reconstruction in space.

Definition at line 69 of file eno_mod.hpp.

5.19.2 Constructor & Destructor Documentation

ENO_mod::ENO_mod (Parameters & *par,* VECT *z*)

Constructor.

Initializations.

Parameters

in	*par*	parameter, contains all the values from the parameters file.
in	*z*	topography.

Warning

Problem: allocation of som_z failed.

Note

If som_z cannot be allocated, the code will exit with failure termination code.

Definition at line 58 of file eno_mod.cpp.

ENO_mod::∼ENO_mod ( )

Destructor.

Definition at line 215 of file eno_mod.cpp.

5.19.3 Member Function Documentation

void ENO_mod::calc (VECT *h,* VECT *u,* VECT *z,* VECT & *hr,* VECT & *hl,* VECT & *delz,* VECT & *ur,* VECT & *ul,* VECT & *dzi*) [virtual]

Calculates the reconstruction in space.

Calls the calculation of the second order reconstruction in space, with a modified ENO formulation, see Bouchut [2004], Bouchut [2007].

Parameters

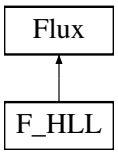
in	*h*	water height.
in	*u*	velocity of the flow.
in	*z*	topography.
out	*hr*	reconstructed water height on the right of the cell.
out	*hl*	reconstructed water height on the left of the cell.
out	*delz*	difference between two reconstructed topographies on the same boundary (from two adjacent cells).
out	*ur*	reconstructed velocity on the right of the cell.
out	*ul*	reconstructed velocity on the left of the cell.
out	*dzi*	difference between the reconstructed topographies on the left and on the right boundary of a cell.

Implements Reconstruction.
Definition at line 81 of file eno_mod.cpp.
The documentation for this class was generated from the following files:

- Headers/libreconstructions/eno_mod.hpp
- Sources/libreconstructions/eno_mod.cpp

5.20 F_HLL Class Reference

HLL flux.
`#include <f_hll.hpp>`
Inheritance diagram for F_HLL:



Public Member Functions

- F_HLL ()
  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR)
  Calculates the numerical flux.
- virtual ~F_HLL ()
  Destructor.

Additional Inherited Members

5.20.1 Detailed Description

HLL flux.
Class that computes HLL numerical flux.
Definition at line 69 of file f_hll.hpp.

5.20.2 Constructor & Destructor Documentation

F_HLL::F_HLL ( )

Constructor.
Definition at line 58 of file f_hll.cpp.

F_HLL::~F_HLL ( ) [virtual]

Destructor.

Definition at line 124 of file f_hll.cpp.

5.20.3 Member Function Documentation

void F_HLL::calc (SCALAR *h_L*, SCALAR *u_L*, SCALAR *h_R*, SCALAR *u_R*) [virtual]

Calculates the numerical flux.

If the water heights on the two sides are small or $c_1 \approx c_2 \approx 0$, there is no water. Else, HLL formulation is used (see Bouchut [2004]):

$$\mathscr{F}(U_L,U_R) = \begin{cases} F(U_L) & \text{if} \quad 0 < c_1 (\leq c_2), \\ \dfrac{c_2 F(U_L) - c_1 F(U_R)}{c_2 - c_1} + \dfrac{c_1 c_2}{c_2 - c_1}(U_R - U_L) & \text{if} \quad c_1 < 0 < c_2, \\ F(U_R) & \text{if} \quad (c_1 \leq) c_2 < 0, \end{cases}$$

with

$$c_1 = \inf_{U=U_L,U_R} \left(\inf_{j\in\{1,2\}} \lambda_j(U) \right) \text{ and } c_2 = \sup_{U=U_L,U_R} \left(\sup_{j\in\{1,2\}} \lambda_j(U) \right),$$

where $\lambda_1(U) = u - \sqrt{gh}$ and $\lambda_2(U) = u + \sqrt{gh}$ are the eigenvalues of the Shallow Water system, $U = {}^t(h, hu)$ and $F(U) = {}^t(hu, hu^2 + gh^2/2)$.

Parameters

in	*h_L*	water height at the left of the interface where the flux is calculated.
in	*u_L*	velocity at the left of the interface where the flux is calculated.
in	*h_R*	water height at the right of the interface where the flux is calculated.
in	*u_R*	velocity at the right of the interface where the flux is calculated.

Modifies

Flux::f1 first componant of the numerical flux.
Flux::f2 second componant of the numerical flux.
Flux::cfl value of the CFL.

Note

Long double are used locally in the computation to avoid numerical approximations.

Todo Check if the use of long double should be generalized to other fluxes.

Implements Flux.

Definition at line 61 of file f_hll.cpp.

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

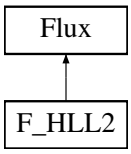
- Headers/libflux/f_hll.hpp
- Sources/libflux/f_hll.cpp

5.21 F_HLL2 Class Reference

HLL flux.

`#include <f_hll2.hpp>`

Inheritance diagram for F_HLL2:



Public Member Functions

- F_HLL2 ()

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR)

  Calculates the numerical flux.
- virtual ∼F_HLL2 ()

  Destructor.

Additional Inherited Members

5.21.1 Detailed Description

HLL flux.

Class that computes HLL numerical flux with a reduced formulation.

Definition at line 70 of file f_hll2.hpp.

5.21.2 Constructor & Destructor Documentation

F_HLL2::F_HLL2 ( )

Constructor.

Definition at line 58 of file f_hll2.cpp.

F_HLL2::∼F_HLL2 ( ) [virtual]

Destructor.

Definition at line 106 of file f_hll2.cpp.

5.21.3 Member Function Documentation

void F_HLL2::calc (SCALAR *h_L*, SCALAR *u_L*, SCALAR *h_R*, SCALAR *u_R*) [virtual]

Calculates the numerical flux.

If the water heights on the two sides are small, there is no water. Else, HLL reduced formulation is used (see Batten et al. [1997]):

$$\mathscr{F}(U_L,U_R) = t_1 F(U_R) + t_2 F(U_L) - t_3(U_R - U_L),$$

with

$$t_1 = \frac{\min(c_2,0) - \min(c_1,0)}{c_2 - c_1}, \quad t_2 = 1 - t_1, \quad t_3 = \frac{c_2|c_1| - c_1|c_2|}{2(c_2 - c_1)},$$

$$c_1 = \inf_{U=U_L,U_R} \left(\inf_{j\in\{1,2\}} \lambda_j(U) \right) \text{ and } c_2 = \sup_{U=U_L,U_R} \left(\sup_{j\in\{1,2\}} \lambda_j(U) \right),$$

where $\lambda_1(U) = u - \sqrt{gh}$ and $\lambda_2(U) = u + \sqrt{gh}$ are the eigenvalues of the Shallow Water system, $U = {}^t(h, hu)$ and $F(U) = {}^t(hu, hu^2 + gh^2/2)$.

Parameters

in	*h_L*	water height at the left of the interface where the flux is calculated.
in	*u_L*	velocity at the left of the interface where the flux is calculated.
in	*h_R*	water height at the right of the interface where the flux is calculated.
in	*u_R*	velocity at the right of the interface where the flux is calculated.

Modifies

Flux::f1 first componant of the numerical flux.
Flux::f2 second componant of the numerical flux.
Flux::cfl value of the CFL.

Implements Flux.
Definition at line 61 of file f_hll2.cpp.
The documentation for this class was generated from the following files:

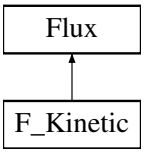
- Headers/libflux/f_hll2.hpp
- Sources/libflux/f_hll2.cpp

5.22 F_Kinetic Class Reference

Kinetic flux.

`#include <f_kinetic.hpp>`

Inheritance diagram for F_Kinetic:



Public Member Functions

- F_Kinetic ()

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR)

  Calculates the numerical flux.
- virtual ~F_Kinetic ()

  Destructor.

Additional Inherited Members

5.22.1 Detailed Description

Kinetic flux.

Class that computes the kinetic numerical flux.
Definition at line 70 of file f_kinetic.hpp.

5.22.2 Constructor & Destructor Documentation

F_Kinetic::F_Kinetic ( )

Constructor.

Definition at line 58 of file f_kinetic.cpp.

F_Kinetic::~F_Kinetic ( ) [virtual]

Destructor.

Definition at line 124 of file f_kinetic.cpp.

5.22.3 Member Function Documentation

void F_Kinetic::calc (SCALAR *h_L*, SCALAR *u_L*, SCALAR *h_R*, SCALAR *u_R*) [virtual]

Calculates the numerical flux.

If the water heights on the two sides are small, there is no water. Else, the kinetic formulation is used (see Audusse et al. [2000]):

$$\mathscr{F}(U_L,U_R) = F_+(U_L) + F_-(U_R)$$

$$F_+(U_L) = \frac{h_L}{2\sqrt{3T_L}} \begin{pmatrix} \frac{{M_+}^2 - {M_-}^2}{2} \\ \frac{{M_+}^3 - {M_-}^3}{3} \end{pmatrix}, \quad F_-(U_R) = \frac{h_R}{2\sqrt{3T_R}} \begin{pmatrix} \frac{{m_+}^2 - {m_-}^2}{2} \\ \frac{{m_+}^3 - {m_-}^3}{3} \end{pmatrix},$$

where

$$\begin{aligned} M_+ &= \max(0, u_L + \sqrt{3T_L}), & m_+ &= \min(0, u_R + \sqrt{3T_R}), \\ M_- &= \max(0, u_L - \sqrt{3T_L}), & m_- &= \min(0, u_R - \sqrt{3T_R}), \end{aligned}$$

with $T_L = gh_L/2, T_R = gh_R/2$, $U = {}^t(h, hu)$ and $F(U) = {}^t(hu, hu^2 + gh^2/2)$.

Parameters

in	*h_L*	water height at the left of the interface where the flux is calculated.
in	*u_L*	velocity at the left of the interface where the flux is calculated.
in	*h_R*	water height at the right of the interface where the flux is calculated.
in	*u_R*	velocity at the right of the interface where the flux is calculated.

Modifies

Flux::f1 first componant of the numerical flux.
Flux::f2 second componant of the numerical flux.
Flux::cfl value of the CFL.

Implements Flux.

Definition at line 64 of file f_kinetic.cpp.

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

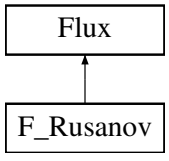
- Headers/libflux/f_kinetic.hpp
- Sources/libflux/f_kinetic.cpp

5.23 F_Rusanov Class Reference

Rusanov flux.

`#include <f_rusanov.hpp>`

Inheritance diagram for F_Rusanov:



Public Member Functions

- F_Rusanov ()
  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR)
  Calculates the numerical flux.
- virtual ∼F_Rusanov ()
  Destructor.

Additional Inherited Members

5.23.1 Detailed Description

Rusanov flux.
Class that computes Rusanov numerical flux.
Definition at line 69 of file f_rusanov.hpp.

5.23.2 Constructor & Destructor Documentation

F_Rusanov::F_Rusanov ( )

Constructor.
Definition at line 58 of file f_rusanov.cpp.

F_Rusanov::∼F_Rusanov ( ) [virtual]

Destructor.
Definition at line 98 of file f_rusanov.cpp.

5.23.3 Member Function Documentation

void F_Rusanov::calc (SCALAR *h_L*, SCALAR *u_L*, SCALAR *h_R*, SCALAR *u_R*) [virtual]

Calculates the numerical flux.
If the water heights on the two sides are small, there is no water. Else, Rusanov formulation is used (see Bouchut [2004]):

$$\mathscr{F}(U_L,U_R) = \frac{F(U_L)+F(U_R)}{2} - c\frac{U_R-U_L}{2},$$

with $c = \max\left(|u_L|+\sqrt{gh_L}, |u_R|+\sqrt{gh_R}\right)$, $U = {}^t(h,hu)$ and $F(U) = {}^t(hu, hu^2+gh^2/2)$.

Parameters

in	*h_L*	water height at the left of the interface where the flux is calculated.
in	*u_L*	velocity at the left of the interface where the flux is calculated.
in	*h_R*	water height at the right of the interface where the flux is calculated.
in	*u_R*	velocity at the right of the interface where the flux is calculated.

Modifies

Flux::f1 first componant of the numerical flux.
Flux::f2 second componant of the numerical flux.
Flux::cfl value of the CFL.

Implements Flux.
Definition at line 61 of file f_rusanov.cpp.
The documentation for this class was generated from the following files:

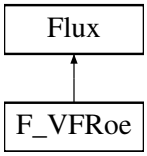
- Headers/libflux/f_rusanov.hpp
- Sources/libflux/f_rusanov.cpp

5.24 F_VFRoe Class Reference

VFRoe flux.

`#include <f_vfroe.hpp>`

Inheritance diagram for F_VFRoe:



Public Member Functions

- F_VFRoe ()

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR, SCALAR)

  Calculates the numerical flux.
- virtual ~F_VFRoe ()

  Destructor.

Additional Inherited Members

5.24.1 Detailed Description

VFRoe flux.

Class that computes the VFRoe-ncv numerical flux.

Definition at line 70 of file f_vfroe.hpp.

5.24.2 Constructor & Destructor Documentation

F_VFRoe::F_VFRoe ( )

Constructor.

Definition at line 58 of file f_vfroe.cpp.

F_VFRoe::~F_VFRoe ( ) [virtual]

Destructor.

Definition at line 151 of file f_vfroe.cpp.

5.24.3 Member Function Documentation

void F_VFRoe::calc (SCALAR *h_L*, SCALAR *u_L*, SCALAR *h_R*, SCALAR *u_R*) [virtual]

Calculates the numerical flux.

The VFRoe-ncv formulation is used (see Gallouët et al. [2003]):

$$\mathscr{F}(U_L,U_R) = \begin{cases} F(U_L) & \text{if} \quad 0 < \lambda_1(\widetilde{U}), \\ F(U_*) & \text{if} \quad \lambda_1(\widetilde{U}) < 0 < \lambda_2(\widetilde{U}), \\ F(U_R) & \text{if} \quad \lambda_2(\widetilde{U}) < 0, \end{cases}$$

with $U = \begin{pmatrix} h \\ hu \end{pmatrix}$, $F(U) = \begin{pmatrix} hu \\ hu^2 + gh^2/2 \end{pmatrix}$ and $\lambda_1(U) = u - \sqrt{gh}$, $\lambda_2(U) = u + \sqrt{gh}$ are the eigenvalues of the Shallow Water system. The mean state $\widetilde{W}$ is defined by

$$\widetilde{W} = \begin{pmatrix} 2\sqrt{g\tilde{h}} \\ \tilde{u} \end{pmatrix} = \begin{pmatrix} 2\tilde{c} \\ \tilde{u} \end{pmatrix} = \begin{pmatrix} \sqrt{gh_L} + \sqrt{gh_R} \\ \dfrac{u_L + u_R}{2} \end{pmatrix},$$

and the mean Roe states h_* and u_* are given by $\begin{cases} \sqrt{gh_*} = c_* = \tilde{c} - (u_R - u_L)/4, \\ u_* = \tilde{u} - (\sqrt{gh_R} - \sqrt{gh_L}). \end{cases}$

If the eigenvalues satisfy $\lambda_1(U_L) < 0 < \lambda_1(U_R)$ or $\lambda_2(U_L) < 0 < \lambda_2(U_R)$, we can get non-entropic solutions. Then the entropy is corrected thanks to the Rusanov flux.

Parameters

in	*h_L*	water height at the left of the interface where the flux is calculated.
in	*u_L*	velocity at the left of the interface where the flux is calculated.
in	*h_R*	water height at the right of the interface where the flux is calculated.
in	*u_R*	velocity at the right of the interface where the flux is calculated.

Modifies

Flux::f1 first componant of the numerical flux.
Flux::f2 second componant of the numerical flux.
Flux::cfl value of the CFL.

Implements Flux.
Definition at line 74 of file f_vfroe.cpp.
The documentation for this class was generated from the following files:

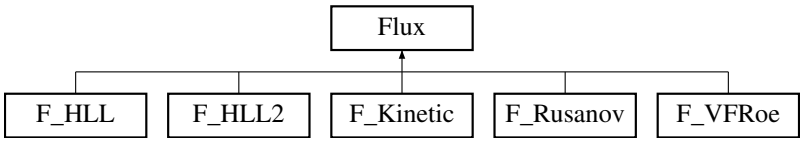
- Headers/libflux/f_vfroe.hpp
- Sources/libflux/f_vfroe.cpp

5.25 Flux Class Reference

Numerical flux.

`#include <flux.hpp>`

Inheritance diagram for Flux:



Public Member Functions

- Flux ()

  Constructor.
- virtual void calc (SCALAR, SCALAR, SCALAR, SCALAR)=0

  Function to be specified in each numerical flux.
- void set_tx (SCALAR)

  Sets the variable Flux::tx.
- SCALAR get_f1 () const

  Gives the first component of the numerical flux.
- SCALAR get_f2 () const

Gives the second component of the numerical flux.

- SCALAR get_cfl () const

  Gives the CFL value.

- virtual ∼Flux ()

  Destructor.

Protected Attributes

- SCALAR f1
- SCALAR f2
- SCALAR cfl
- SCALAR tx

5.25.1 Detailed Description

Numerical flux.

Class that contains all the common declarations for the numerical fluxes.

Definition at line 71 of file flux.hpp.

5.25.2 Constructor & Destructor Documentation

Flux::Flux ( )

Constructor.

Definition at line 58 of file flux.cpp.

Flux::∼Flux ( ) [virtual]

Destructor.

Definition at line 106 of file flux.cpp.

5.25.3 Member Function Documentation

virtual void Flux::calc (SCALAR , SCALAR , SCALAR , SCALAR) [pure virtual]

Function to be specified in each numerical flux.

Implemented in F_HLL2, F_Kinetic, F_VFRoe, F_HLL, and F_Rusanov.

SCALAR Flux::get_cfl ( ) const

Gives the CFL value.

Returns

Flux::cfl value of the CFL.

Definition at line 96 of file flux.cpp.

SCALAR Flux::get_f1 ( ) const

Gives the first component of the numerical flux.

Returns

Flux::f1 first componant of the numerical flux.

Definition at line 76 of file flux.cpp.

SCALAR Flux::get_f2 ( ) const

Gives the second component of the numerical flux.

Returns

Flux::f2 second componant of the numerical flux.

Definition at line 86 of file flux.cpp.

void Flux::set_tx (SCALAR *tx*)

Sets the variable Flux::tx.

Sets the value given in parameter to the variable ***tx***.

Parameters

in	*tx*	value of dt/dx.

Definition at line 65 of file flux.cpp.

5.25.4 Member Data Documentation

SCALAR Flux::cfl [protected]

CFL value.

Definition at line 103 of file flux.hpp.

SCALAR Flux::f1 [protected]

First component of the numerical flux.

Definition at line 99 of file flux.hpp.

SCALAR Flux::f2 [protected]

Second component of the numerical flux.

Definition at line 101 of file flux.hpp.

SCALAR Flux::tx [protected]

Value of dt/dx.

Definition at line 105 of file flux.hpp.

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

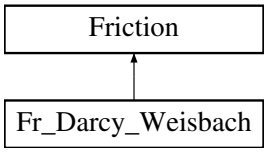
- Headers/libflux/flux.hpp
- Sources/libflux/flux.cpp

5.26 Fr_Darcy_Weisbach Class Reference

Darcy-Weisbach law.

`#include <fr_darcy_weisbach.hpp>`

Inheritance diagram for Fr_Darcy_Weisbach:



Public Member Functions

- Fr_Darcy_Weisbach ()

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR)

  Calculates the Darcy-Weisbach friction term.
- virtual ~Fr_Darcy_Weisbach ()

  Destructor.

Additional Inherited Members

5.26.1 Detailed Description

Darcy-Weisbach law.

General formulation: $S_f = \frac{fu|u|}{8gh}$. This term is integrated in the code thanks to a semi-implicit method.

Definition at line 70 of file fr_darcy_weisbach.hpp.

5.26.2 Constructor & Destructor Documentation

Fr_Darcy_Weisbach::Fr_Darcy_Weisbach ( )

Constructor.

Definition at line 58 of file fr_darcy_weisbach.cpp.

Fr_Darcy_Weisbach::~Fr_Darcy_Weisbach ( ) [virtual]

Destructor.

Definition at line 81 of file fr_darcy_weisbach.cpp.

5.26.3 Member Function Documentation

void Fr_Darcy_Weisbach::calc (SCALAR *uold*, SCALAR *hnew*, SCALAR *qnew*) [virtual]

Calculates the Darcy-Weisbach friction term.

General formulation (see Smith et al. [2007]): $S_f = \frac{fu|u|}{8gh}$. This term is integrated in the code thanks to a semi-implicit method:

$$q_i^{n+1} = \frac{q_i^*}{1 + dt\,\frac{f|u_i^n|}{8h_i^{n+1}}}$$

where f is the friction coefficient.

Parameters

in	*uold*	velocity at the previous time (n if you are calculating the $n+1$th time step), denoted by u_i^n in the above formula.
in	*hnew*	water height after the Shallow-Water computation (without friction), denoted by h_i^{n+1} in the above formula.
in	*qnew*	discharge after the Shallow-Water computation (without friction), denoted by q_i^* in the above formula.

Modifies

friction::qmod discharge modified by the friction term.

Note

The friction only affects the discharge ($h^{n+1} = h^*$).

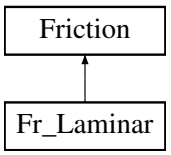
Todo For future evolutions: the friction coefficient shoud be added as in 2D as a parameter of Fr_Darcy_↩ Weisbach::calc.

Implements Friction.
Definition at line 61 of file fr_darcy_weisbach.cpp.
The documentation for this class was generated from the following files:

- Headers/libfrictions/fr_darcy_weisbach.hpp
- Sources/libfrictions/fr_darcy_weisbach.cpp

5.27 Fr_Laminar Class Reference

Laminar law.
`#include <fr_laminar.hpp>`
Inheritance diagram for Fr_Laminar:



Public Member Functions

- Fr_Laminar ()
  Constructor.
- void calc (SCALAR, SCALAR, SCALAR)
  Calculates the laminar friction term.
- virtual ∼Fr_Laminar ()
  Destructor.

Additional Inherited Members

5.27.1 Detailed Description

Laminar law.
General formulation: $S_f = \nu \frac{1}{gh} \frac{u}{h}$. This term is integrated in the code thanks to an implicit method.
Definition at line 70 of file fr_laminar.hpp.

5.27.2 Constructor & Destructor Documentation

Fr_Laminar::Fr_Laminar ( )

Constructor.
Definition at line 57 of file fr_laminar.cpp.

Fr_Laminar::∼Fr_Laminar ( ) [virtual]

Destructor.
Definition at line 82 of file fr_laminar.cpp.

5.27.3 Member Function Documentation

void Fr_Laminar::calc (SCALAR *uold*, SCALAR *hnew*, SCALAR *qnew*) [virtual]

Calculates the laminar friction term.

General formulation: $S_f = \nu \frac{1}{gh} \frac{u}{h}$. This term is integrated in the code thanks to an implicit method:

$$q_i^{n+1} = \frac{q_i^*}{1 + \nu dt \frac{1}{(h_i^{n+1})^2}}$$

where ν is the friction coefficient.

Parameters

in	*uold*	velocity at the previous time (unused).
in	*hnew*	water height after the Shallow-Water computation (without friction), denoted by h_i^{n+1} in the above formula.
in	*qnew*	discharge after the Shallow-Water computation (without friction), denoted by q_i^* in the above formula.

Modifies

friction::qmod discharge modified by the friction term.

Note

The friction only affects the discharge ($h^{n+1} = h^*$).

Todo For future evolutions: the friction coefficient shoud be added as in 2D as a parameter of Fr_Laminar::calc.

Implements Friction.

Definition at line 60 of file fr_laminar.cpp.

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

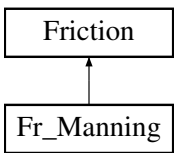
- Headers/libfrictions/fr_laminar.hpp
- Sources/libfrictions/fr_laminar.cpp

5.28 Fr_Manning Class Reference

Manning law.

`#include <fr_manning.hpp>`

Inheritance diagram for Fr_Manning:



Public Member Functions

- Fr_Manning ()

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR)

  Calculates the Manning friction term.
- virtual ~Fr_Manning ()

  Destructor.

Additional Inherited Members

5.28.1 Detailed Description

Manning law.

General formulation: $S_f = c^2 \frac{u|u|}{h^{4/3}}$. This term is integrated in the code thanks to a semi-implicit method.

Definition at line 71 of file fr_manning.hpp.

5.28.2 Constructor & Destructor Documentation

Fr_Manning::Fr_Manning ( )

Constructor.

Definition at line 58 of file fr_manning.cpp.

Fr_Manning::~Fr_Manning ( ) [virtual]

Destructor.

Definition at line 81 of file fr_manning.cpp.

5.28.3 Member Function Documentation

void Fr_Manning::calc (SCALAR *uold*, SCALAR *hnew*, SCALAR *qnew*) [virtual]

Calculates the Manning friction term.

General formulation (see Smith et al. [2007]): $S_f = c^2 \frac{u|u|}{h^{4/3}}$. This term is integrated in the code thanks to a semi-implicit method:

$$q_i^{n+1} = \frac{q_i^*}{1 + dt \frac{c^2 g |u_i^n|}{(h_i^{n+1})^{4/3}}}$$

where c is the friction coefficient.

Parameters

in	*uold*	velocity at the previous time (n if you are calculating the $n+1$th time step), denoted by u_i^n in the above formula.
in	*hnew*	water height after the Shallow-Water computation (without friction), denoted by h_i^{n+1} in the above formula.
in	*qnew*	discharge after the Shallow-Water computation (without friction), denoted by q_i^* in the above formula.

Modifies

friction::qmod discharge modified by the friction term.

Note

The friction only affects the discharge ($h^{n+1} = h^*$).

Todo For future evolutions: the friction coefficient shoud be added as in 2D as a parameter of Fr_Manning::calc.

Implements Friction.

Definition at line 61 of file fr_manning.cpp.

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

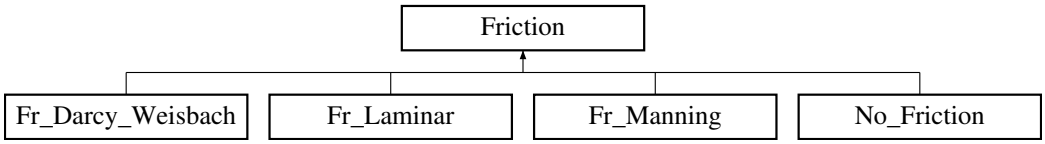
- Headers/libfrictions/fr_manning.hpp
- Sources/libfrictions/fr_manning.cpp

5.29 Friction Class Reference

Friction law

`#include <friction.hpp>`

Inheritance diagram for Friction:



Public Member Functions

- Friction ()

  Constructor.
- virtual void calc (SCALAR, SCALAR, SCALAR)=0

  Function to be specified in each friction law.
- SCALAR get_qmod () const

  Gives the discharge modified by the friction term.
- void set_c (SCALAR)

  Sets the friction coefficient Friction::c.
- void set_dt (SCALAR)

  Sets the time step Friction::dt.
- virtual ~Friction ()

  Destructor.

Protected Attributes

- SCALAR qmod
- SCALAR c
- SCALAR dt

5.29.1 Detailed Description

Friction law

Class that contains all the common declarations for the friction law. The friction is computed with a semi-implicit method.

Definition at line 71 of file friction.hpp.

5.29.2 Constructor & Destructor Documentation

Friction::Friction ( )

Constructor.

Definition at line 59 of file friction.cpp.

Friction::~Friction ( ) [virtual]

Destructor.

Definition at line 96 of file friction.cpp.

5.29.3 Member Function Documentation

virtual void Friction::calc (SCALAR , SCALAR , SCALAR) [pure virtual]

Function to be specified in each friction law.

Implemented in Fr_Manning, Fr_Darcy_Weisbach, Fr_Laminar, and No_Friction.

SCALAR Friction::get_qmod ( ) const

Gives the discharge modified by the friction term.

Returns

Friction::qmod discharge modified by the friction term.

Definition at line 62 of file friction.cpp.

void Friction::set_c (SCALAR *c*)

Sets the friction coefficient Friction::c.

Sets the value given in parameter to the variable ***c***.

Parameters

in	*c*	value of the friction coefficient.

Todo For future evolutions: Friction::set_c will not be necessary when the friction coefficient will be read as in 2D.

Definition at line 72 of file friction.cpp.

void Friction::set_dt (SCALAR *dt*)

Sets the time step Friction::dt.

Sets the value given in parameter to the variable ***dt***.

Parameters

in	*dt*	value of the time step.

Definition at line 84 of file friction.cpp.

5.29.4 Member Data Documentation

SCALAR Friction::c [protected]

Friction coefficient.

Definition at line 98 of file friction.hpp.

SCALAR Friction::dt [protected]

Time step.

Definition at line 100 of file friction.hpp.

SCALAR Friction::qmod [protected]

Discharge modified by the friction term.

Definition at line 96 of file friction.hpp.

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

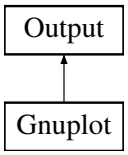
- Headers/libfrictions/friction.hpp
- Sources/libfrictions/friction.cpp

5.30 Gnuplot Class Reference

Gnuplot output

`#include <gnuplot.hpp>`

Inheritance diagram for Gnuplot:



Public Member Functions

- Gnuplot (Parameters &)

  Constructor.
- void write (VECT, VECT, VECT, int)

  Saves one time step.
- virtual ∼Gnuplot ()

  Destructor.

Additional Inherited Members

5.30.1 Detailed Description

Gnuplot output

Class that writes the result in the output file with a structure optimized for Gnuplot.

Definition at line 70 of file gnuplot.hpp.

5.30.2 Constructor & Destructor Documentation

Gnuplot::Gnuplot (Parameters & *par*)

Constructor.

Writes the header of the file 'huz_evolution.dat' if Parameters::nbtimes is (strictly) positive.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Warning

Impossible to open the ∗∗∗ file. Verify if the directory ∗∗∗ exists.

Note

If huz_evolution.dat cannot be opened, the code will exit with failure termination code.

Definition at line 58 of file gnuplot.cpp.

Gnuplot::∼Gnuplot ( ) `[virtual]`

Destructor.

Definition at line 122 of file gnuplot.cpp.

5.30.3 Member Function Documentation

void Gnuplot::write (VECT *h*, VECT *q*, VECT *z*, int *n*) [virtual]

Saves one time step.

Writes the values of Scheme::h, Scheme::u (=q/h), Scheme::z, Scheme::q, Scheme::h+ Scheme::z (free surface), and the Froude number $\frac{q}{h\sqrt{gh}}$ at the current time in huz_evolution.dat.
If the water height is too small, we replace it by 0, the velocity is null and the Froude number does not exist.

Parameters

in	*h*	the water height.
in	*q*	the discharge.
in	*z*	the topography.
in	*n*	the index of the current time step (the time is n Parameters::dt).

Implements Output.

Definition at line 91 of file gnuplot.cpp.

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

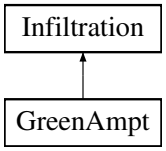
- Headers/libsave/gnuplot.hpp
- Sources/libsave/gnuplot.cpp

5.31 GreenAmpt Class Reference

Green-Ampt law.

`#include <greenampt.hpp>`

Inheritance diagram for GreenAmpt:



Public Member Functions

- GreenAmpt (Parameters &)

  Constructor.
- SCALAR capacity (const SCALAR, const SCALAR, const SCALAR, const SCALAR Kc, const SCALAR Ks, const SCALAR dtheta, const SCALAR Psi, const SCALAR zcrust)

  Calculates the infiltration capacity.
- void calc (const VECT &, const VECT &, const SCALAR)

  Calculates the infiltrated volume.
- virtual ~GreenAmpt ()

  Destructor.

Additional Inherited Members

5.31.1 Detailed Description

Green-Ampt law.

Class that computes the infiltrated volume and modified water height with Green-Ampt 1d law.

Definition at line 69 of file greenampt.hpp.

5.31.2 Constructor & Destructor Documentation

GreenAmpt::GreenAmpt (Parameters & *par*)

Constructor.

Initializes the values for Green-Ampt infiltration.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Warning

$***$: ERROR: the value at the point $***$.

Definition at line 57 of file greenampt.cpp.

GreenAmpt::~GreenAmpt ( ) [virtual]

Destructor.

Definition at line 288 of file greenampt.cpp.

5.31.3 Member Function Documentation

void GreenAmpt::calc (const VECT & *h,* const VECT & *Vin_tot,* const SCALAR *dt*) [virtual]

Calculates the infiltrated volume.

Parameters

in	*h*	water height.
in	*Vin_tot*	total infiltrated volume.
in	*dt*	time step.

Modifies

Infiltration::hmod modified water height.

Infiltration::Vin total infiltrated volume containing the current time step.

Implements Infiltration.

Definition at line 248 of file greenampt.cpp.

SCALAR GreenAmpt::capacity (const SCALAR *h,* const SCALAR *Vin_tot,* const SCALAR *dt,* const SCALAR *Kc,* const SCALAR *Ks,* const SCALAR *dtheta,* const SCALAR *Psi,* const SCALAR *zcrust*)

Calculates the infiltration capacity.

The infiltration capacity is given by:

$$I_C = \begin{cases} K_s(1+\frac{Psi+h}{Z_f}) & \text{if} \quad zcrust = 0 \\ K_c(1+\frac{Psi+h}{Z_f}) & \text{if} \quad Z_f \leq zcrust \\ K_e(1+\frac{Psi+h}{Z_f}) & \end{cases},$$

with the effective hydraulic conductivity

$$K_e = \frac{1}{\frac{1}{Ks} * (1 - \frac{zcrust * dtheta}{Vin_tot}) + zcrust * \frac{dtheta}{Vin_tot} * \frac{1}{Kc}}$$

Parameters

in	*h*	water height.
in	*Vin_tot*	total infiltrated volume.
in	*dt*	time step (unused).
in	*Kc*	hydraulic conductivity of the (upper) crust.
in	*Ks*	hydraulic conductivity of the (lower) soil.
in	*dtheta*	water content.
in	*Psi*	load pressure.
in	*zcrust*	thickness of the (upper) crust.

Returns

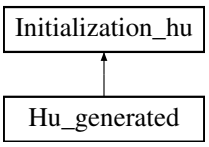
Ic: infiltration capacity.

Definition at line 207 of file greenampt.cpp.
The documentation for this class was generated from the following files:

- Headers/librain_infiltration/greenampt.hpp
- Sources/librain_infiltration/greenampt.cpp

5.32 Hu_generated Class Reference

No water configuration.
`#include <hu_generated.hpp>`
Inheritance diagram for Hu_generated:



Public Member Functions

- Hu_generated (Parameters &)
  Constructor.
- void initialization (VECT &, VECT &)
  Performs the initialization.
- virtual ~Hu_generated ()
  Destructor.

Additional Inherited Members

5.32.1 Detailed Description

No water configuration.
Class that initializes the water height and the velocity for a dry domain.
Definition at line 71 of file hu_generated.hpp.

5.32.2 Constructor & Destructor Documentation

Hu_generated::Hu_generated (Parameters & *par*)

Constructor.

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 59 of file hu_generated.cpp.

Hu_generated::~Hu_generated ( ) [virtual]

Destructor.

Definition at line 81 of file hu_generated.cpp.

5.32.3 Member Function Documentation

void Hu_generated::initialization (VECT & *h*, VECT & *u*) [virtual]

Performs the initialization.

Initializes the water height and the velocity at 0.

Parameters

in,out	*h*	water height.
in,out	*u*	velocity.

Implements Initialization_hu.

Definition at line 66 of file hu_generated.cpp.

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

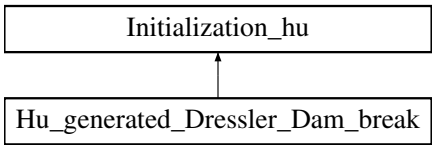
- Headers/libinitializations/hu_generated.hpp
- Sources/libinitializations/hu_generated.cpp

5.33 Hu_generated_Dressler_Dam_break Class Reference

Dressler dam break configuration.

`#include <hu_generated_dressler_dam_break.hpp>`

Inheritance diagram for Hu_generated_Dressler_Dam_break:



Public Member Functions

- Hu_generated_Dressler_Dam_break (Parameters &)

  Constructor.
- void initialization (VECT &, VECT &)

  Performs the initialization.
- virtual ~Hu_generated_Dressler_Dam_break ()

  Destructor.

Additional Inherited Members

5.33.1 Detailed Description

Dressler dam break configuration.

Class that initializes the water height and the velocity for a dam break as studied by Dressler (with friction).

Definition at line 71 of file hu_generated_dressler_dam_break.hpp.

5.33.2 Constructor & Destructor Documentation

Hu_generated_Dressler_Dam_break::Hu_generated_Dressler_Dam_break (Parameters & *par*)

Constructor.

Defines the position of the dam (half of the domain), the water height before the dam (6 meters), the water height after the dam (0 meters) and the velocity (0 m/s), see Dressler [1952].

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 58 of file hu_generated_dressler_dam_break.cpp.

Hu_generated_Dressler_Dam_break::~Hu_generated_Dressler_Dam_break ( ) [virtual]

Destructor.

Definition at line 92 of file hu_generated_dressler_dam_break.cpp.

5.33.3 Member Function Documentation

void Hu_generated_Dressler_Dam_break::initialization (VECT & *h*, VECT & *u*) [virtual]

Performs the initialization.

Initializes the water height and the velocity, before and after the dam.

Parameters

in,out	*h*	water height.
in,out	*u*	velocity.

Implements Initialization_hu.

Definition at line 73 of file hu_generated_dressler_dam_break.cpp.

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

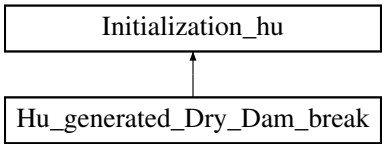
- Headers/libinitializations/hu_generated_dressler_dam_break.hpp
- Sources/libinitializations/hu_generated_dressler_dam_break.cpp

5.34 Hu_generated_Dry_Dam_break Class Reference

Dry dam break configuration.

`#include <hu_generated_dry_dam_break.hpp>`

Inheritance diagram for Hu_generated_Dry_Dam_break:



Public Member Functions

- Hu_generated_Dry_Dam_break (Parameters &)

  Constructor.
- void initialization (VECT &, VECT &)

  Performs the initialization.
- virtual ~Hu_generated_Dry_Dam_break ()

  Destructor.

Additional Inherited Members

5.34.1 Detailed Description

Dry dam break configuration.

Class that initializes the water height and the velocity for a dam break on a dry domain.

Definition at line 71 of file hu_generated_dry_dam_break.hpp.

5.34.2 Constructor & Destructor Documentation

Hu_generated_Dry_Dam_break::Hu_generated_Dry_Dam_break (Parameters & *par*)

Constructor.

Defines the position of the dam (half of the domain), the water height before the dam (5 millimeters), the water height after the dam (0 meters) and the velocity (0 m/s), see Goutal and Maurel [1997], Audusse et al. [2000].

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 58 of file hu_generated_dry_dam_break.cpp.

Hu_generated_Dry_Dam_break::~Hu_generated_Dry_Dam_break ( ) [virtual]

Destructor.

Definition at line 92 of file hu_generated_dry_dam_break.cpp.

5.34.3 Member Function Documentation

void Hu_generated_Dry_Dam_break::initialization (VECT & *h*, VECT & *u*) [virtual]

Performs the initialization.

Initializes the water height and the velocity, before and after the dam.

Parameters

in,out	*h*	water height.
in,out	*u*	velocity.

Implements Initialization_hu.

Definition at line 73 of file hu_generated_dry_dam_break.cpp.

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

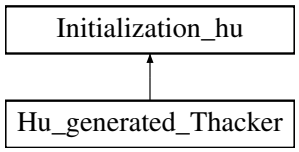
- Headers/libinitializations/hu_generated_dry_dam_break.hpp
- Sources/libinitializations/hu_generated_dry_dam_break.cpp

5.35 Hu_generated_Thacker Class Reference

Thacker configuration.

`#include <hu_generated_thacker.hpp>`

Inheritance diagram for Hu_generated_Thacker:



Public Member Functions

- Hu_generated_Thacker (Parameters &)

  Constructor.
- void initialization (VECT &, VECT &)

  Performs the initialization.
- virtual ~Hu_generated_Thacker ()

  Destructor.

Additional Inherited Members

5.35.1 Detailed Description

Thacker configuration.

Class that initializes the water height and the velocity for Thacker's benchmark.

Definition at line 71 of file hu_generated_thacker.hpp.

5.35.2 Constructor & Destructor Documentation

Hu_generated_Thacker::Hu_generated_Thacker (Parameters & *par*)

Constructor.

Defines the position of the wet domain (between x1 and x2) and the value of the topography at the center of the domain (-h0).

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 58 of file hu_generated_thacker.cpp.

Hu_generated_Thacker::~Hu_generated_Thacker ( ) [virtual]

Destructor.

Definition at line 101 of file hu_generated_thacker.cpp.

5.35.3 Member Function Documentation

void Hu_generated_Thacker::initialization (VECT & *h*, VECT & *u*) [virtual]

Performs the initialization.

Initializes the water height in order to have a plane surface between x1 and x2, and the velocity is null, see Thacker [1981].

Parameters

in,out	*h*	water height.
in,out	*u*	velocity.

Implements Initialization_hu.

Definition at line 75 of file hu_generated_thacker.cpp.

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

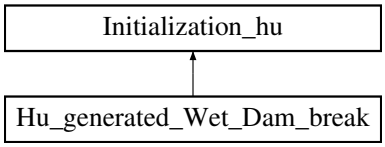
- Headers/libinitializations/hu_generated_thacker.hpp
- Sources/libinitializations/hu_generated_thacker.cpp

5.36 Hu_generated_Wet_Dam_break Class Reference

Wet dam break configuration.

`#include <hu_generated_wet_dam_break.hpp>`

Inheritance diagram for Hu_generated_Wet_Dam_break:



Public Member Functions

- Hu_generated_Wet_Dam_break (Parameters &)

  Constructor.
- void initialization (VECT &, VECT &)

  Performs the initialization.
- virtual ~Hu_generated_Wet_Dam_break ()

  Destructor.

Additional Inherited Members

5.36.1 Detailed Description

Wet dam break configuration.

Class that initializes the water height and the velocity for a dam break on a wet domain.

Definition at line 70 of file hu_generated_wet_dam_break.hpp.

5.36.2 Constructor & Destructor Documentation

Hu_generated_Wet_Dam_break::Hu_generated_Wet_Dam_break (Parameters & *par*)

Constructor.

Defines the position of the dam (half of the domain), the water height before the dam (5 millimeters), the water height after the dam (1 millimeter) and the velocity (0 m/s), see Goutal and Maurel [1997].

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 58 of file hu_generated_wet_dam_break.cpp.

Hu_generated_Wet_Dam_break::~Hu_generated_Wet_Dam_break ( ) [virtual]

Destructor.

Definition at line 92 of file hu_generated_wet_dam_break.cpp.

5.36.3 Member Function Documentation

void Hu_generated_Wet_Dam_break::initialization (VECT & *h*, VECT & *u*) [virtual]

Performs the initialization.

Initializes the water height and the velocity, before and after the dam.

Parameters

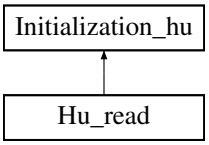
in,out	*h*	water height.
in,out	*u*	velocity.

Implements Initialization_hu.
Definition at line 73 of file hu_generated_wet_dam_break.cpp.
The documentation for this class was generated from the following files:

- Headers/libinitializations/hu_generated_wet_dam_break.hpp
- Sources/libinitializations/hu_generated_wet_dam_break.cpp

5.37 Hu_read Class Reference

File configuration.
`#include <hu_read.hpp>`
Inheritance diagram for Hu_read:



Public Member Functions

- Hu_read (Parameters &)
  Constructor.
- void initialization (VECT &, VECT &)
  Performs the initialization.
- virtual ~Hu_read ()
  Destructor.

Additional Inherited Members

5.37.1 Detailed Description

File configuration.
Class that initializes the water height and of the velocity to the values read in a file.
Definition at line 71 of file hu_read.hpp.

5.37.2 Constructor & Destructor Documentation

Hu_read::Hu_read (Parameters & *par*)

Constructor.
Defines the name of the file for the initialization.
Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 59 of file hu_read.cpp.

Hu_read::~Hu_read ( ) [virtual]

Destructor.
Definition at line 177 of file hu_read.cpp.

5.37.3 Member Function Documentation

void Hu_read::initialization (VECT & *h*, VECT & *u*) [virtual]

Performs the initialization.

Initializes the water height and the velocity to the values read in the corresponding file.

Parameters

in,out	*h*	water height.
in,out	*u*	velocity.

Warning

(hu_namefile): ERROR: cannot open the hu file.
(hu_namefile): ERROR: the number of data in this file is too big
(hu_namefile): ERROR: line ***.
(hu_namefile): WARNING: line ***.
(hu_namefile): ERROR: the number of data in this file is too small
(hu_namefile): ERROR: the value for the point x *** is missing

Note

If the file cannot be opened or if the data are not correct, the code will exit with failure termination code.

Implements Initialization_hu.
Definition at line 70 of file hu_read.cpp.
The documentation for this class was generated from the following files:

- Headers/libinitializations/hu_read.hpp
- Sources/libinitializations/hu_read.cpp

5.38 Hydrostatic Class Reference

Hydrostatic reconstruction

`#include <hydrostatic.hpp>`

Public Member Functions

- Hydrostatic ()

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR)

  Calculates the hydrostatic reconstruction.
- SCALAR get_hhydro_l () const

  Gives the reconstructed water height on the left.
- SCALAR get_hhydro_r () const

  Gives the reconstructed water height on the right.
- virtual ~Hydrostatic ()

  Destructor.

Protected Attributes

- SCALAR hl_rec
- SCALAR hr_rec

5.38.1 Detailed Description

Hydrostatic reconstruction

Class that computes the hydrostatic reconstruction.

Definition at line 68 of file hydrostatic.hpp.

5.38.2 Constructor & Destructor Documentation

Hydrostatic::Hydrostatic ( )

Constructor.

Definition at line 57 of file hydrostatic.cpp.

Hydrostatic::~Hydrostatic ( ) [virtual]

Destructor.

Definition at line 97 of file hydrostatic.cpp.

5.38.3 Member Function Documentation

void Hydrostatic::calc (SCALAR *hl_0,* SCALAR *hr_0,* SCALAR *dz*)

Calculates the hydrostatic reconstruction.

See Audusse et al. [2004] for more details.

Parameters

in	*hl_0*	water height on the cell located at the left of the boundary.
in	*hr_0*	water height on the cell located at the right of the boundary.
in	*dz*	Difference between the values of the topography of the two adjacent cells.

Modifies

Hydrostatic::hl_rec, set to $(hl\_0 - \max(0, dz))_+$.
Hydrostatic::hr_rec, set to $(hr\_0 - \max(0, -dz))_+$.

Definition at line 60 of file hydrostatic.cpp.

SCALAR Hydrostatic::get_hhydro_l ( ) const

Gives the reconstructed water height on the left.

Returns

Hydrostatic::hl_rec Hydrostatic reconstruction on the left.

Definition at line 77 of file hydrostatic.cpp.

SCALAR Hydrostatic::get_hhydro_r ( ) const

Gives the reconstructed water height on the right.

Returns

Hydrostatic::hr_rec Hydrostatic reconstruction on the right.

Definition at line 87 of file hydrostatic.cpp.

5.38.4 Member Data Documentation

SCALAR Hydrostatic::hl_rec [protected]

Hydrostatic reconstruction on the left

Definition at line 88 of file hydrostatic.hpp.

SCALAR Hydrostatic::hr_rec [protected]

Hydrostatic reconstruction on the right

Definition at line 90 of file hydrostatic.hpp.

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

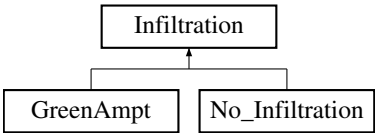
- Headers/libreconstructions/hydrostatic.hpp
- Sources/libreconstructions/hydrostatic.cpp

5.39 Infiltration Class Reference

Definition of infiltration law.

`#include <infiltration.hpp>`

Inheritance diagram for Infiltration:



Public Member Functions

- Infiltration (Parameters &)

  Constructor.
- virtual void calc (const VECT &, const VECT &, const SCALAR)=0

  Function to be specified in each case.
- VECT get_hmod () const

  Gives the modified valued of the water height.
- VECT get_Vin () const

  Gives the infiltrated volume.
- virtual ∼Infiltration ()

  Destructor.

Protected Attributes

- const int NXCELL
- const SCALAR DX
- VECT hmod
- VECT Vin

5.39.1 Detailed Description

Definition of infiltration law.

Class that contains all the common declarations for the infiltration law.

Definition at line 69 of file infiltration.hpp.

5.39.2 Constructor & Destructor Documentation

Infiltration::Infiltration (Parameters & *par*)

Constructor.

Defines the number of cells, the space step, and initializes Infiltration::hmod and Infiltration::Vin.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 57 of file infiltration.cpp.

Infiltration::~Infiltration ( ) [virtual]

Destructor.

Definition at line 95 of file infiltration.cpp.

5.39.3 Member Function Documentation

virtual void Infiltration::calc (const VECT & , const VECT & , const SCALAR) [pure virtual]

Function to be specified in each case.

Implemented in GreenAmpt, and No_Infiltration.

VECT Infiltration::get_hmod ( ) const

Gives the modified valued of the water height.

Returns

The value of Infiltration::hmod.

Definition at line 75 of file infiltration.cpp.

VECT Infiltration::get_Vin ( ) const

Gives the infiltrated volume.

Returns

The value of Infiltration::Vin.

Definition at line 85 of file infiltration.cpp.

5.39.4 Member Data Documentation

const SCALAR Infiltration::DX [protected]

Space step.

Definition at line 91 of file infiltration.hpp.

VECT Infiltration::hmod [protected]

Modified valued of the water height

Definition at line 93 of file infiltration.hpp.

const int Infiltration::NXCELL [protected]

Number of cells in space.

Definition at line 89 of file infiltration.hpp.

VECT Infiltration::Vin [protected]

Infiltrated volume

Definition at line 95 of file infiltration.hpp.

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

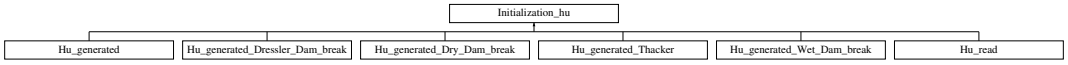
- Headers/librain_infiltration/infiltration.hpp
- Sources/librain_infiltration/infiltration.cpp

5.40 Initialization_hu Class Reference

Initialization of h and u.

`#include <initialization_hu.hpp>`

Inheritance diagram for Initialization_hu:



Public Member Functions

- Initialization_hu (Parameters &)

  Constructor.
- virtual void initialization (VECT &, VECT &)=0

  Function to be specified in each initialization.
- virtual ~Initialization_hu ()

  Destructor.

Protected Attributes

- const int NXCELL
- const int M
- const SCALAR DX

5.40.1 Detailed Description

Initialization of h and u.

Class that contains all the common declarations for the initialization of the water height and of the velocity.

Definition at line 69 of file initialization_hu.hpp.

5.40.2 Constructor & Destructor Documentation

Initialization_hu::Initialization_hu (Parameters & *par*)

Constructor.

Defines the number of cells, of time steps and the space step.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 58 of file initialization_hu.cpp.

Initialization_hu::~Initialization_hu ( ) [virtual]

Destructor.

Definition at line 69 of file initialization_hu.cpp.

5.40.3 Member Function Documentation

virtual void Initialization_hu::initialization (VECT & , VECT &) [pure virtual]

Function to be specified in each initialization.

Implemented in Hu_generated_Dressler_Dam_break, Hu_generated_Dry_Dam_break, Hu_generated_Thacker, Hu_read, Hu_generated, and Hu_generated_Wet_Dam_break.

5.40.4 Member Data Documentation

const SCALAR Initialization_hu::DX [protected]

Space step.

Definition at line 88 of file initialization_hu.hpp.

const int Initialization_hu::M [protected]

Number of time steps.

Definition at line 86 of file initialization_hu.hpp.

const int Initialization_hu::NXCELL [protected]

Number of cells in space.

Definition at line 84 of file initialization_hu.hpp.

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

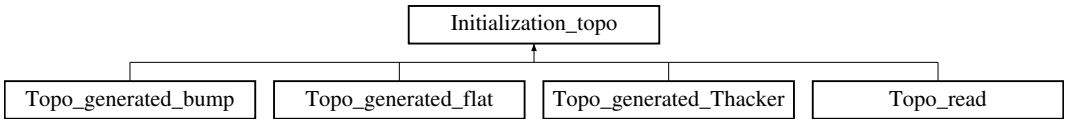
- Headers/libinitializations/initialization_hu.hpp
- Sources/libinitializations/initialization_hu.cpp

5.41 Initialization_topo Class Reference

Initialization of z.

`#include <initialization_topo.hpp>`

Inheritance diagram for Initialization_topo:



Public Member Functions

- Initialization_topo (Parameters &)

  Constructor.
- virtual void initialization (VECT &)=0

  Function to be specified in each initialization.
- virtual ~Initialization_topo ()

  Destructor.

Protected Attributes

- VECT z
- const int NXCELL
- const int M
- const SCALAR DX

5.41.1 Detailed Description

Initialization of z.

Class that contains all the common declarations for the initialization of the topography.

Definition at line 69 of file initialization_topo.hpp.

5.41.2 Constructor & Destructor Documentation

Initialization_topo::Initialization_topo (Parameters & *par*)

Constructor.

Defines the number of cells, of time steps and the space step. Creates z the vector for the topography.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Warning

Problem: allocation of z failed.

Note

If the vector cannot be allocated, the code will exit with failure termination code.

Definition at line 58 of file initialization_topo.cpp.

Initialization_topo::~Initialization_topo ( ) [virtual]

Destructor.

Definition at line 77 of file initialization_topo.cpp.

5.41.3 Member Function Documentation

virtual void Initialization_topo::initialization (VECT &) [pure virtual]

Function to be specified in each initialization.

Implemented in Topo_read, Topo_generated_flat, Topo_generated_Thacker, and Topo_generated_bump.

5.41.4 Member Data Documentation

const SCALAR Initialization_topo::DX [protected]

Space step.

Definition at line 91 of file initialization_topo.hpp.

const int Initialization_topo::M [protected]

Number of time steps.

Definition at line 89 of file initialization_topo.hpp.

const int Initialization_topo::NXCELL [protected]

Number of cells in space.

Definition at line 87 of file initialization_topo.hpp.

VECT Initialization_topo::z [protected]

Vector for the topography.

Definition at line 85 of file initialization_topo.hpp.

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

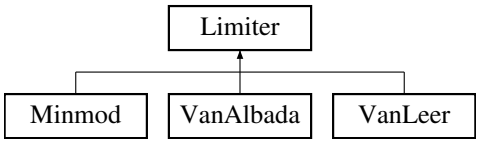
- Headers/libinitializations/initialization_topo.hpp
- Sources/libinitializations/initialization_topo.cpp

5.42 Limiter Class Reference

Slope limiter.

`#include <limiter.hpp>`

Inheritance diagram for Limiter:



Public Member Functions

- Limiter ()

  Constructor.
- virtual void calc (SCALAR, SCALAR)=0

  Function to be specified in each slope limiter.
- SCALAR get_rec () const

  Gives the reconstructed value.
- virtual ∼Limiter ()

  Destructor.

Protected Attributes

- SCALAR rec

5.42.1 Detailed Description

Slope limiter.

Class that contains all the common declarations for the slope limters.

Definition at line 69 of file limiter.hpp.

5.42.2 Constructor & Destructor Documentation

Limiter::Limiter ( )

Constructor.

Definition at line 58 of file limiter.cpp.

Limiter::∼Limiter ( ) [virtual]

Destructor.

Definition at line 72 of file limiter.cpp.

5.42.3 Member Function Documentation

virtual void Limiter::calc (SCALAR , SCALAR) [pure virtual]

Function to be specified in each slope limiter.

Implemented in VanLeer, Minmod, and VanAlbada.

SCALAR Limiter::get_rec ( ) const

Gives the reconstructed value.

Returns

Limiter::rec reconstructed value.

Definition at line 62 of file limiter.cpp.

5.42.4 Member Data Documentation

SCALAR Limiter::rec [protected]

Reconstructed value

Definition at line 88 of file limiter.hpp.

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

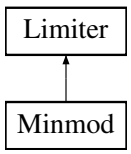
- Headers/liblimitations/limiter.hpp
- Sources/liblimitations/limiter.cpp

5.43 Minmod Class Reference

Minmod slope limiter

`#include <minmod.hpp>`

Inheritance diagram for Minmod:



Public Member Functions

- Minmod ()

  Constructor.
- void calc (SCALAR, SCALAR)

  Calculates the value of the slope limiter.
- virtual ~Minmod ()

  Destructor.

Additional Inherited Members

5.43.1 Detailed Description

Minmod slope limiter

Class that calculates the minmod slope limiter.

Definition at line 69 of file minmod.hpp.

5.43.2 Constructor & Destructor Documentation

Minmod::Minmod ( )

Constructor.

Definition at line 58 of file minmod.cpp.

Minmod::~Minmod ( ) [virtual]

Destructor.

Definition at line 87 of file minmod.cpp.

5.43.3 Member Function Documentation

void Minmod::calc (SCALAR *a*, SCALAR *b*) [virtual]

Calculates the value of the slope limiter.

Minmod function:

$$\text{minmod}(x,y) = \begin{cases} \min(x,y) & \text{if } x,y \geq 0, \\ \max(x,y) & \text{if } x,y \leq 0, \\ 0 & \text{else.} \end{cases}$$

Parameters

in	*a*	slope on the left of the cell.
in	*b*	slope on the right of the cell.

Modifies

Limiter::rec recontructed value.

Implements Limiter.

Definition at line 61 of file minmod.cpp.

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

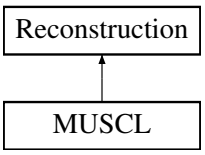
- Headers/liblimitations/minmod.hpp
- Sources/liblimitations/minmod.cpp

5.44 MUSCL Class Reference

MUSCL recontruction

`#include <muscl.hpp>`

Inheritance diagram for MUSCL:



Public Member Functions

- MUSCL (Parameters &, VECT)

  Constructor.
- void calc (VECT, VECT, VECT, VECT &, VECT &, VECT &, VECT &, VECT &, VECT &)

  Calculates the reconstruction in space.
- ~MUSCL ()

  Destructor.

Additional Inherited Members

5.44.1 Detailed Description

MUSCL recontruction

Class that computes MUSCL reconstruction in space.

Definition at line 70 of file muscl.hpp.

5.44.2 Constructor & Destructor Documentation

MUSCL::MUSCL (Parameters & *par,* VECT *z*)

Constructor.

Initializations.

Parameters

in	*par*	parameter, contains all the values from the parameters file.
in	*z*	topography.

Definition at line 58 of file muscl.cpp.

MUSCL::~MUSCL ( )

Destructor.

Definition at line 139 of file muscl.cpp.

5.44.3 Member Function Documentation

void MUSCL::calc (VECT *h,* VECT *u,* VECT *z,* VECT & *hr,* VECT & *hl,* VECT & *delz,* VECT & *ur,* VECT & *ul,* VECT & *dzi*) [virtual]

Calculates the reconstruction in space.

Calls the calculation of the second order reconstruction in space with MUSCL formulation, see van Leer [1979] Bouchut [2007].

Parameters

in	*h*	water height.
in	*u*	velocity of the flow.
in	*z*	topography.
out	*hr*	reconstructed water height on the right of the cell.
out	*hl*	reconstructed water height on the left of the cell.
out	*delz*	difference between two reconstructed topographies on the same boundary (from two adjacent cells).
out	*ur*	reconstructed velocity on the right of the cell.
out	*ul*	reconstructed velocity on the left of the cell.
out	*dzi*	difference between the reconstructed topographies on the left and on the right boundary of a cell.

Note

Long double are used locally in the computation to avoid numerical approximations.

Todo Check if the use of long double should be generalized to other reconstructions.

Implements Reconstruction.

Definition at line 68 of file muscl.cpp.

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

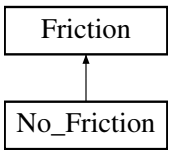
- Headers/libreconstructions/muscl.hpp
- Sources/libreconstructions/muscl.cpp

5.45 No_Friction Class Reference

No friction.

`#include <no_friction.hpp>`

Inheritance diagram for No_Friction:



Public Member Functions

- No_Friction ()

  Constructor.
- void calc (SCALAR, SCALAR, SCALAR)

  Does no calculation.
- virtual ~No_Friction ()

  Destructor.

Additional Inherited Members

5.45.1 Detailed Description

No friction.

Does no computation.

Definition at line 69 of file no_friction.hpp.

5.45.2 Constructor & Destructor Documentation

No_Friction::No_Friction ( )

Constructor.

Definition at line 57 of file no_friction.cpp.

No_Friction::~No_Friction ( ) [virtual]

Destructor.

Definition at line 79 of file no_friction.cpp.

5.45.3 Member Function Documentation

void No_Friction::calc (SCALAR *uold,* SCALAR *hnew,* SCALAR *qnew*) [virtual]

Does no calculation.

No computation (no friction).

Parameters

in	*uold*	velocity at the previous time (unused).
in	*hnew*	water height after the Shallow-Water computation (without friction) (unused).

in	*qnew*	discharge after the Shallow-Water computation (without friction).

Modifies

Friction::qmod discharge modified by the friction term.

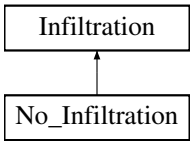
Todo For future evolutions: the friction coefficient shoud be added as in 2D as a parameter of Fr_Manning::calc.

Implements Friction.
Definition at line 60 of file no_friction.cpp.
The documentation for this class was generated from the following files:

- Headers/libfrictions/no_friction.hpp
- Sources/libfrictions/no_friction.cpp

5.46 No_Infiltration Class Reference

No infiltration.
`#include <no_infiltration.hpp>`
Inheritance diagram for No_Infiltration:



Public Member Functions

- No_Infiltration (Parameters &)
  Constructor.
- void calc (const VECT &, const VECT &, const SCALAR)
  Does no infiltration.
- virtual ~No_Infiltration ()
  Destructor.

Additional Inherited Members

5.46.1 Detailed Description

No infiltration.
The water height and infiltrated volume remain unchanged.
Definition at line 68 of file no_infiltration.hpp.

5.46.2 Constructor & Destructor Documentation

No_Infiltration::No_Infiltration (Parameters & *par*)

Constructor.
Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 57 of file no_infiltration.cpp.

No_Infiltration::~No_Infiltration ( ) [virtual]

Destructor.

Definition at line 84 of file no_infiltration.cpp.

5.46.3 Member Function Documentation

void No_Infiltration::calc (const VECT & *h*, const VECT & *Vin_tot*, const SCALAR *dt*) [virtual]

Does no infiltration.

No computation (water height and infiltrated volume remain unchanged).

Parameters

in	*h*	water height.
in	*Vin_tot*	total infiltrated volume.
in	*dt*	time step (unused).

Modifies

Infiltration::hmod modified water height.
Infiltration::Vin total infiltrated volume containing the current time step.

Implements Infiltration.

Definition at line 64 of file no_infiltration.cpp.

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

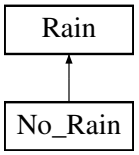
- Headers/librain_infiltration/no_infiltration.hpp
- Sources/librain_infiltration/no_infiltration.cpp

5.47 No_Rain Class Reference

No rain.

`#include <no_rain.hpp>`

Inheritance diagram for No_Rain:



Public Member Functions

- No_Rain (Parameters &)

  Constructor.
- void rain_func (SCALAR, VECT &)

  Sets the rain intensity to zero.
- virtual ~No_Rain ()

  Destructor.

Additional Inherited Members

5.47.1 Detailed Description

No rain.

Sets the rain intensity to zero.

Definition at line 69 of file no_rain.hpp.

5.47.2 Constructor & Destructor Documentation

No_Rain::No_Rain (Parameters & *par*)

Constructor.

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 57 of file no_rain.cpp.

No_Rain::~No_Rain ( ) [virtual]

Destructor.

Definition at line 82 of file no_rain.cpp.

5.47.3 Member Function Documentation

void No_Rain::rain_func (SCALAR *time*, VECT & *Tab_rain*) [virtual]

Sets the rain intensity to zero.

No computation (rain intensity set to zero).

Parameters

in	*time*	current time (unused).
in,out	*Tab_rain*	rain intensity at the current time on each cell.

Implements Rain.

Definition at line 66 of file no_rain.cpp.

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

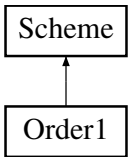
- Headers/librain_infiltration/no_rain.hpp
- Sources/librain_infiltration/no_rain.cpp

5.48 Order1 Class Reference

Order 1 scheme.

`#include <order1.hpp>`

Inheritance diagram for Order1:



Public Member Functions

- Order1 (Parameters &)

  Constructor.
- void calc ()

  Performs the numerical scheme.
- virtual ∼Order1 ()

  Destructor.

Additional Inherited Members

5.48.1 Detailed Description

Order 1 scheme.

Class that computes the solution with a numerical scheme at order 1.

Definition at line 69 of file order1.hpp.

5.48.2 Constructor & Destructor Documentation

Order1::Order1 (Parameters & *par*)

Constructor.

Initialization of Scheme::delta_z.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 58 of file order1.cpp.

Order1::∼Order1 ( ) [virtual]

Destructor.

Definition at line 166 of file order1.cpp.

5.48.3 Member Function Documentation

void Order1::calc ( ) [virtual]

Performs the numerical scheme.

Performs the first order numerical scheme.

Note

In DEBUG mode, the programme will save two other files with boundary fluxes and volumes of water.

Implements Scheme.

Definition at line 71 of file order1.cpp.

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

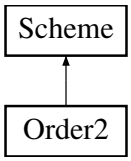
- Headers/libschemes/order1.hpp
- Sources/libschemes/order1.cpp

5.49 Order2 Class Reference

Order 2 scheme.

`#include <order2.hpp>`

Inheritance diagram for Order2:



Public Member Functions

- Order2 (Parameters &)

  Constructor.
- void calc ()

  Performs the numerical scheme.
- virtual ∼Order2 ()

  Destructor.

Additional Inherited Members

5.49.1 Detailed Description

Order 2 scheme.

Class that computes the solution with a numerical scheme at order 2.

Definition at line 69 of file order2.hpp.

5.49.2 Constructor & Destructor Documentation

Order2::Order2 (Parameters & *par*)

Constructor.

Initializations, definition of the reconstruction and creation 3 vectors for this reconstruction.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Warning

Problem: allocation of ∗sa failed.

Note

If a vector cannot be allocated, the code will exit with failure termination code.

Definition at line 59 of file order2.cpp.

Order2::∼Order2 ( ) [virtual]

Destructor.

Definition at line 223 of file order2.cpp.

5.49.3 Member Function Documentation

void Order2::calc ( ) [virtual]

Performs the numerical scheme.

Performs the second order numerical scheme.

Note

In DEBUG mode, the program will save two other files with boundary fluxes and volumes of water.

Implements Scheme.

Definition at line 114 of file order2.cpp.

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

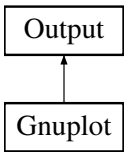
- Headers/libschemes/order2.hpp
- Sources/libschemes/order2.cpp

5.50 Output Class Reference

Output format

`#include <output.hpp>`

Inheritance diagram for Output:



Public Member Functions

- Output (Parameters &)

  Constructor.
- virtual void write (VECT, VECT, VECT, int)=0

  Function to be specified in each output format.
- void initial (VECT, VECT, VECT)

  Saves the initial time.
- void result (SCALAR, clock_t, SCALAR, SCALAR, SCALAR, SCALAR, SCALAR)

  Saves global values.
- void bound_flux (int, SCALAR, SCALAR, SCALAR, SCALAR)

  Saves the flux and the cumulative flux on the boundaries.
- void check_vol (int, SCALAR, SCALAR, SCALAR, SCALAR)

  Saves the infiltrated and rain volumes.
- void save (VECT, VECT, VECT)

  Saves the final time.
- virtual ~Output ()

  Destructor.

Protected Attributes

- const int NXCELL
- const int M
- const SCALAR DX
- const SCALAR DT
- const int NBTIMES
- int nbt
- string outputDirectory
- string namefile_init
- string namefile_end
- string namefile_res
- string namefile_flux
- string namefile_check_volume

5.50.1 Detailed Description

Output format

Class that contains all the common declarations for the output formats.

Definition at line 68 of file output.hpp.

5.50.2 Constructor & Destructor Documentation

Output::Output (Parameters & *par*)

Constructor.

Defines the names of the outputs.

If run in DEBUG mode, writes the header of the files 'boundary_flux.dat' and 'check_vol.dat'.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Warning

Impossible to open the *** file. Verify if the directory *** exists.

Note

If boundary_flux.dat or check_vol.dat cannot be opened, the code will exit with failure termination code.

Definition at line 57 of file output.cpp.

Output::~Output ( ) [virtual]

Destructor.

Definition at line 248 of file output.cpp.

5.50.3 Member Function Documentation

void Output::bound_flux (int *time,* SCALAR *f_l,* SCALAR *f_r,* SCALAR *cum_f_l,* SCALAR *cum_f_r*)

Saves the flux and the cumulative flux on the boundaries.

Parameters

in	*time*	current time (number of iterations).
in	*f_l*	flux on the left boundary (m^2/s).
in	*f_r*	flux on the right boundary (m^2/s).
in	*cum_f_l*	cumulative flux on the left boundary (m^2).
in	*cum_f_r*	cumulative flux on the right boundary (m^2).

Definition at line 140 of file output.cpp.

void Output::check_vol (int *time,* SCALAR *Vol_rain_tot,* SCALAR *Vol_inf_tot,* SCALAR *Vol_of_tot,* SCALAR *Vol_bound_tot*)

Saves the infiltrated and rain volumes.

Parameters

in	*time*	current time (number of iterations).
in	*Vol_rain_tot*	total rain volume.
in	*Vol_inf_tot*	total volume of infiltrated water.
in	*Vol_of_tot*	total volume of overland flow.
in	*Vol_bound_tot*	total outflow volume at the boundary.

Definition at line 190 of file output.cpp.

void Output::initial (VECT *z,* VECT *h,* VECT *u*)

Saves the initial time.

Parameters

in	*h*	water height.
in	*u*	velocity.
in	*z*	topography.

Warning

Impossible to open the $***$ file. Verify if the directory $***$ exists.

Note

If huz_initial.dat cannot be opened, the code will exit with failure termination code.

Definition at line 112 of file output.cpp.

void Output::result (SCALAR *t,* clock_t *cpu,* SCALAR *froude,* SCALAR *Vol_rain_tot,* SCALAR *Vol_inf_tot,* SCALAR *Vol_of_tot,* SCALAR *Vol_bound_tot*)

Saves global values.

Parameters

in	*t*	elapsed time.
in	*cpu*	CPU time.
in	*froude*	mean Froude number (in space) at the final time.
in	*Vol_rain_tot*	total rain volume.

in	*Vol_inf_tot*	total volume of infiltrated water.
in	*Vol_of_tot*	total volume of overland flow.
in	*Vol_bound_tot*	total outflow volume at the boundary.

Warning

Impossible to open the $***$ file. Verify if the directory $***$ exists.

Note

If results.dat cannot be opened, the code will exit with failure termination code.

Definition at line 208 of file output.cpp.

void Output::save (VECT *z*, VECT *h*, VECT *q*)

Saves the final time.

If the water height is too small, we replace it by 0, the velocity and discharge are null and the Froude number does not exist.

Parameters

in	*z*	topography.
in	*h*	water height.
in	*q*	discharge.

Warning

Impossible to open the $***$ file. Verify if the directory $***$ exists.

Note

If huz_final.dat cannot be opened, the code will exit with failure termination code.

Definition at line 156 of file output.cpp.

virtual void Output::write (VECT , VECT , VECT , int) [pure virtual]

Function to be specified in each output format.

Implemented in Gnuplot.

5.50.4 Member Data Documentation

const SCALAR Output::DT [protected]

Time step.

Definition at line 105 of file output.hpp.

const SCALAR Output::DX [protected]

Space step.

Definition at line 103 of file output.hpp.

const int Output::M [protected]

Number of time steps.

Definition at line 101 of file output.hpp.

string Output::namefile_check_volume [protected]

Name of the file where the infiltrated and rain volumes are saved.
Definition at line 121 of file output.hpp.

string Output::namefile_end [protected]

Name of the file where the final time is saved.
Definition at line 115 of file output.hpp.

string Output::namefile_flux [protected]

Name of the file where the boundary fluxes are saved.
Definition at line 119 of file output.hpp.

string Output::namefile_init [protected]

Name of the file where the initialization is saved.
Definition at line 113 of file output.hpp.

string Output::namefile_res [protected]

Name of the file where the global results are saved.
Definition at line 117 of file output.hpp.

int Output::nbt [protected]

Number of times steps between two savings.
Definition at line 109 of file output.hpp.

const int Output::NBTIMES [protected]

Number of times saved.
Definition at line 107 of file output.hpp.

const int Output::NXCELL [protected]

Number of cells in space.
Definition at line 99 of file output.hpp.

string Output::outputDirectory [protected]

Name of the output directory.
Definition at line 111 of file output.hpp.
The documentation for this class was generated from the following files:

- Headers/libsave/output.hpp
- Sources/libsave/output.cpp

5.51 Parameters Class Reference

Gets parameters.
`#include <parameters.hpp>`

Public Member Functions

- Parameters ()

  Constructor.
- virtual ∼Parameters ()

  Destructor.
- void setparameters (const char ∗)

  Sets the parameters.
- int get_Nxcell () const

  Gives the number of cells in space.
- int get_m () const

  Gives the number of time steps to attain the final time.
- int get_nbtimes () const

  Gives the number of times saved.
- SCALAR get_dx () const

  Gives the space step.
- SCALAR get_dt () const

  Gives the time step.
- SCALAR get_tx () const

  Gives the value of dt/dx.
- int get_Lbound () const

  Gives the value corresponding to the left boundary condition.
- SCALAR get_L_imp_q () const

  Gives the value of the imposed discharge in left bc.
- SCALAR get_L_imp_h () const

  Gives the value of the imposed water height in left bc.
- int get_Rbound () const

  Gives the value corresponding to the right boundary condition.
- SCALAR get_R_imp_q () const

  Gives the value of the imposed discharge in right bc.
- SCALAR get_R_imp_h () const

  Gives the value of the imposed water height in right bc.
- int get_flux () const

  Gives the value corresponding to the flux.
- int get_order () const

  Gives the order of the scheme.
- SCALAR get_cfl () const

  Gives the cfl of the scheme.
- int get_rec () const

  Gives the value corresponding to the reconstruction.
- int get_fric () const

  Gives the value corresponding to the friction law.
- SCALAR get_friccoef () const

  Gives the value of the friction coefficient.
- int get_lim () const

  Gives the value corresponding to the limiter.
- int get_topo () const

Gives the value corresponding to the topography.

- int get_hu () const

  Gives the value corresponding to the initialization of h and u.

- int get_rain () const

  Gives the value corresponding to the initialization of the rain.

- int get_inf () const

  Gives the value corresponding to the initialization of the infiltration.

- int get_Kc_init () const

  Gives the value corresponding to the initialization of Kc.

- SCALAR get_Kc_coef () const

  Gives the value of the Kc coefficient.

- int get_Ks_init () const

  Gives the value corresponding to the initialization of Ks.

- SCALAR get_Ks_coef () const

  Gives the value of the Ks coefficient.

- int get_dtheta_init () const

  Gives the value corresponding to the initialization of dtheta.

- SCALAR get_dtheta_coef () const

  Gives the value of the dtheta coefficient.

- int get_Psi_init () const

  Gives the value corresponding to the initialization of Psi.

- SCALAR get_Psi_coef () const

  Gives the value of the Psi coefficient.

- int get_zcrust_init () const

  Gives the value corresponding to the initialization of zcrust.

- SCALAR get_zcrust_coef () const

  Gives the value of the zcrust coefficient.

- int get_imax_init () const

  Gives the value corresponding to the initialization of imax.

- SCALAR get_imax_coef () const

  Gives the value of the imax coefficient.

- SCALAR get_amortENO () const

  Gives the value of the amortENO parameter.

- SCALAR get_modifENO () const

  Gives the value of the modifENO parameter.

- string get_topographyNameFile () const

  Gives the topography path + Input directory.

- string get_huNameFile (void) const

  Gives the h and u path for the initialization + Input directory.

- string get_rainNameFile (void) const

  Gives the rain path for the initialization + Input directory.

- string get_KcNameFile (void) const

  Gives the Kc path for the initialization + Input directory.

- string get_KsNameFile (void) const

  Gives the Ks path for the initialization + Input directory.

- string get_dthetaNameFile (void) const

  Gives the dtheta path for the initialization + Input directory.

- string get_PsiNameFile (void) const

  Gives the Psi path for the initialization + Input directory.
- string get_zcrustNameFile (void) const

  Gives the zcrust path for the initialization + Input directory.
- string get_imaxNameFile (void) const

  Gives the imax path for the initialization + Input directory.
- string get_topographyNameFileS () const

  Gives the topography namefile (inside the Input directory)
- string get_huNameFileS (void) const

  Gives the h and u namefile for the initialization (inside the Input directory)
- string get_rainNameFileS (void) const

  Gives the rain namefile for the initialization (inside the Input directory)
- string get_KcNameFileS () const

  Gives the Kc namefile (inside the Input directory)
- string get_KsNameFileS () const

  Gives the Ks namefile (inside the Input directory)
- string get_dthetaNameFileS () const

  Gives the dtheta namefile (inside the Input directory)
- string get_PsiNameFileS () const

  Gives the Psi namefile (inside the Input directory)
- string get_zcrustNameFileS () const

  Gives the zcrust namefile (inside the Input directory)
- string get_imaxNameFileS () const

  Gives the imax namefile (inside the Input directory)
- string get_outputDirectory (void) const

  Gives the output directory with the suffix.
- string get_suffix (void) const

  Gives the suffix for the 'Outputs' directory.
- void fill_array (VECT &, const SCALAR) const

  Fills the VECT array with a SCALAR.
- void fill_array (VECT &, string) const

  Fills the VECT array with the values contained in a file.

Protected Attributes

- int Nxcell
- int m
- int nbtimes
- SCALAR dx
- SCALAR dt
- SCALAR tx
- SCALAR L
- SCALAR T
- SCALAR cfl
- int Lbound
- int Rbound
- SCALAR L_imp_q
- SCALAR L_imp_h

- SCALAR R_imp_q
- SCALAR R_imp_h
- int flux
- int order
- int rec
- int fric
- int lim
- int topo
- int hu_init
- int rain
- int inf
- int Kc_init
- int Ks_init
- int dtheta_init
- int Psi_init
- int zcrust_init
- int imax_init
- SCALAR amortENO
- SCALAR modifENO
- SCALAR friccoef
- SCALAR Kc_coef
- SCALAR Ks_coef
- SCALAR dtheta_coef
- SCALAR Psi_coef
- SCALAR zcrust_coef
- SCALAR imax_coef
- string topography_namefile
- string topo_NF
- string hu_namefile
- string hu_NF
- string rain_namefile
- string rain_NF
- string Kc_namefile
- string Kc_NF
- string Ks_namefile
- string Ks_NF
- string dtheta_namefile
- string dtheta_NF
- string Psi_namefile
- string Psi_NF
- string zcrust_namefile
- string zcrust_NF
- string imax_namefile
- string imax_NF
- string output_directory
- string suffix_o

5.51.1 Detailed Description

Gets parameters.

Class that reads the parameters, checks their values and contains all the common declarations to get the values of the parameters.

Definition at line 74 of file parameters.hpp.

5.51.2 Constructor & Destructor Documentation

Parameters::Parameters ( )

Constructor.

Definition at line 59 of file parameters.cpp.

Parameters::∼Parameters ( ) [virtual]

Destructor.

Definition at line 1070 of file parameters.cpp.

5.51.3 Member Function Documentation

void Parameters::fill_array (VECT & *myarray,* const SCALAR *myvalue*) const

Fills the VECT array with a SCALAR.

Fills an array with a constant value.

Parameters

in,out	*myarray*	array to fill.
in	*myvalue*	value.

Definition at line 1644 of file parameters.cpp.

void Parameters::fill_array (VECT & *myarray,* string *namefile*) const

Fills the VECT array with the values contained in a file.

Fills an array with the values given in the file

Parameters

in,out	*myarray*	array to fill.
in	*namefile*	name of the file containing the values to be inserted into the array.

Warning

∗∗∗: ERROR: cannot open the file.
∗∗∗: ERROR: the number of data in this file is too big/small.
∗∗∗: ERROR: line ∗∗∗.
∗∗∗: ERROR: the value for the point x = ∗∗∗ y = ∗∗∗ is missing.
∗∗∗: WARNING: line ∗∗∗ ; a commentary should begin with the # symbol.

Note

If the array cannot be filled correctly, the code will exit with failure termination code.

Definition at line 1656 of file parameters.cpp.

SCALAR Parameters::get_amortENO ( ) const

Gives the value of the amortENO parameter.

Returns

The value of the amortENO parameter Parameters::amortENO.

Definition at line 1263 of file parameters.cpp.

SCALAR Parameters::get_cfl ( ) const

Gives the cfl of the scheme.

Returns

The cfl of the scheme Parameters::cfl.

Definition at line 1213 of file parameters.cpp.

SCALAR Parameters::get_dt ( ) const

Gives the time step.

Returns

The time step Parameters::dt.

Definition at line 1113 of file parameters.cpp.

SCALAR Parameters::get_dtheta_coef ( ) const

Gives the value of the dtheta coefficient.

Returns

The value of dtheta Parameters::dtheta_coef.

Definition at line 1473 of file parameters.cpp.

int Parameters::get_dtheta_init ( ) const

Gives the value corresponding to the initialization of dtheta.

Returns

The value corresponding to the initialization of dtheta Parameters::dtheta_init.

Definition at line 1463 of file parameters.cpp.

string Parameters::get_dthetaNameFile (void) const

Gives the dtheta path for the initialization + Input directory.

Returns

The dtheta path for the initialization + Input directory Parameters::dtheta_namefile.

Definition at line 1483 of file parameters.cpp.

string Parameters::get_dthetaNameFileS ( ) const

Gives the dtheta namefile (inside the Input directory)

Returns

The dtheta namefile for the initialization (inside the Input directory) Parameters::dtheta_NF.

Definition at line 1493 of file parameters.cpp.

SCALAR Parameters::get_dx ( ) const

Gives the space step.

Returns

The space step Parameters::dx.

Definition at line 1093 of file parameters.cpp.

int Parameters::get_flux ( ) const

Gives the value corresponding to the flux.

Returns

The value corresponding to the flux Parameters::flux.

Definition at line 1193 of file parameters.cpp.

int Parameters::get_fric ( ) const

Gives the value corresponding to the friction law.

Returns

The value corresponding to the friction law Parameters::fric.

Definition at line 1233 of file parameters.cpp.

SCALAR Parameters::get_friccoef ( ) const

Gives the value of the friction coefficient.

Returns

The value of the friction coefficient Parameters::friccoef.

Definition at line 1243 of file parameters.cpp.

int Parameters::get_hu ( ) const

Gives the value corresponding to the initialization of h and u.

Returns

The value corresponding to the initialization of h and u Parameters::hu_init.

Definition at line 1333 of file parameters.cpp.

string Parameters::get_huNameFile (void) const

Gives the h and u path for the initialization + Input directory.

Returns

The h and u path for the initialization + Input directory Parameters::hu_namefile.

Definition at line 1313 of file parameters.cpp.

string Parameters::get_huNameFileS (void) const

Gives the h and u namefile for the initialization (inside the Input directory)

Returns

The h and u namefile for the initialization (inside the Input directory) Parameters::hu_NF.

Definition at line 1323 of file parameters.cpp.

SCALAR Parameters::get_imax_coef ( ) const

Gives the value of the imax coefficient.

Returns

The value of imax Parameters::imax_coef.

Definition at line 1593 of file parameters.cpp.

int Parameters::get_imax_init ( ) const

Gives the value corresponding to the initialization of imax.

Returns

The value corresponding to the initialization of imax Parameters::imax_init.

Definition at line 1583 of file parameters.cpp.

string Parameters::get_imaxNameFile (void) const

Gives the imax path for the initialization + Input directory.

Returns

The imax path for the initialization + Input directory Parameters::imax_namefile.

Definition at line 1603 of file parameters.cpp.

string Parameters::get_imaxNameFileS ( ) const

Gives the imax namefile (inside the Input directory)

Returns

The imax namefile for the initialization (inside the Input directory) Parameters::imax_NF.

Definition at line 1613 of file parameters.cpp.

int Parameters::get_inf ( ) const

Gives the value corresponding to the initialization of the infiltration.

Returns

The value corresponding to the infiltration Parameters::inf.

Definition at line 1373 of file parameters.cpp.

SCALAR Parameters::get_Kc_coef ( ) const

Gives the value of the Kc coefficient.

Returns

The value of Kc Parameters::Kc_coef.

Definition at line 1393 of file parameters.cpp.

int Parameters::get_Kc_init ( ) const

Gives the value corresponding to the initialization of Kc.

Returns

The value corresponding to the initialization of Kc Parameters::Kc_init.

Definition at line 1383 of file parameters.cpp.

string Parameters::get_KcNameFile (void) const

Gives the Kc path for the initialization + Input directory.

Returns

The Kc path for the initialization + Input directory Parameters::Kc_namefile.

Definition at line 1403 of file parameters.cpp.

string Parameters::get_KcNameFileS ( ) const

Gives the Kc namefile (inside the Input directory)

Returns

The Kc namefile for the initialization (inside the Input directory) Parameters::Kc_NF.

Definition at line 1413 of file parameters.cpp.

SCALAR Parameters::get_Ks_coef ( ) const

Gives the value of the Ks coefficient.

Returns

The value of Ks Parameters::Ks_coef.

Definition at line 1433 of file parameters.cpp.

int Parameters::get_Ks_init ( ) const

Gives the value corresponding to the initialization of Ks.

Returns

The value corresponding to the initialization of Ks Parameters::Ks_init.

Definition at line 1423 of file parameters.cpp.

string Parameters::get_KsNameFile (void) const

Gives the Ks path for the initialization + Input directory.

Returns

The Ks path for the initialization + Input directory Parameters::Ks_namefile.

Definition at line 1443 of file parameters.cpp.

string Parameters::get_KsNameFileS ( ) const

Gives the Ks namefile (inside the Input directory)

Returns

The Ks namefile for the initialization (inside the Input directory) Parameters::Ks_NF.

Definition at line 1453 of file parameters.cpp.

SCALAR Parameters::get_L_imp_h ( ) const

Gives the value of the imposed water height in left bc.

Returns

The value of the imposed water height in the left boundary condition Parameters::L_imp_h.

Definition at line 1153 of file parameters.cpp.

SCALAR Parameters::get_L_imp_q ( ) const

Gives the value of the imposed discharge in left bc.

Returns

The value of the imposed discharge in the left boundary condition Parameters::L_imp_q.

Definition at line 1143 of file parameters.cpp.

int Parameters::get_Lbound ( ) const

Gives the value corresponding to the left boundary condition.

Returns

The value corresponding to the left boundary condition Parameters::Lbound.

Definition at line 1133 of file parameters.cpp.

int Parameters::get_lim ( ) const

Gives the value corresponding to the limiter.

Returns

The value corresponding to the limiter Parameters::lim.

Definition at line 1253 of file parameters.cpp.

int Parameters::get_m ( ) const

Gives the number of time steps to attain the final time.

Returns

The number of time steps to attain the final time Parameters::m.

Definition at line 1083 of file parameters.cpp.

SCALAR Parameters::get_modifENO ( ) const

Gives the value of the modifENO parameter.

Returns

The value of the modifENO parameter Parameters::modifENO.

Definition at line 1273 of file parameters.cpp.

int Parameters::get_nbtimes ( ) const

Gives the number of times saved.

Returns

The number of times saved Parameters::nbtimes.

Definition at line 1103 of file parameters.cpp.

int Parameters::get_Nxcell ( ) const

Gives the number of cells in space.

Returns

The number of cells in space Parameters::Nxcell.

Definition at line 1073 of file parameters.cpp.

int Parameters::get_order ( ) const

Gives the order of the scheme.

Returns

The order of the scheme Parameters::order.

Definition at line 1203 of file parameters.cpp.

string Parameters::get_outputDirectory (void) const

Gives the output directory with the suffix.

Returns

The output directory with the suffix Parameters::output_directory.

Definition at line 1623 of file parameters.cpp.

SCALAR Parameters::get_Psi_coef ( ) const

Gives the value of the Psi coefficient.

Returns

The value of Psi Parameters::Psi_coef.

Definition at line 1513 of file parameters.cpp.

int Parameters::get_Psi_init ( ) const

Gives the value corresponding to the initialization of Psi.

Returns

The value corresponding to the initialization of Psi Parameters::Psi_init.

Definition at line 1503 of file parameters.cpp.

string Parameters::get_PsiNameFile (void) const

Gives the Psi path for the initialization + Input directory.

Returns

The Psi path for the initialization + Input directory Parameters::Psi_namefile.

Definition at line 1523 of file parameters.cpp.

string Parameters::get_PsiNameFileS ( ) const

Gives the Psi namefile (inside the Input directory)

Returns

The Psi namefile for the initialization (inside the Input directory) Parameters::Psi_NF.

Definition at line 1533 of file parameters.cpp.

SCALAR Parameters::get_R_imp_h ( ) const

Gives the value of the imposed water height in right bc.

Returns

The value of the imposed water height in the right boundary condition Parameters::R_imp_h.

Definition at line 1183 of file parameters.cpp.

SCALAR Parameters::get_R_imp_q ( ) const

Gives the value of the imposed discharge in right bc.

Returns

The value of the imposed discharge in the right boundary condition Parameters::R_imp_q.

Definition at line 1173 of file parameters.cpp.

int Parameters::get_rain ( ) const

Gives the value corresponding to the initialization of the rain.

Returns

The value corresponding to the initialization of the rain Parameters::rain.

Definition at line 1363 of file parameters.cpp.

string Parameters::get_rainNameFile (void) const

Gives the rain path for the initialization + Input directory.

Returns

The rain path for the initialization + Input directory Parameters::rain_namefile.

Definition at line 1343 of file parameters.cpp.

string Parameters::get_rainNameFileS (void) const

Gives the rain namefile for the initialization (inside the Input directory)

Returns

The rain namefile for the initialization (inside the Input directory) Parameters::rain_NF.

Definition at line 1353 of file parameters.cpp.

int Parameters::get_Rbound ( ) const

Gives the value corresponding to the right boundary condition.

Returns

The value corresponding to the right boundary condition Parameters::Rbound.

Definition at line 1163 of file parameters.cpp.

int Parameters::get_rec ( ) const

Gives the value corresponding to the reconstruction.

Returns

The value corresponding to the reconstruction Parameters::rec.

Definition at line 1223 of file parameters.cpp.

string Parameters::get_suffix (void) const

Gives the suffix for the 'Outputs' directory.

Returns

The suffix (for the output directory) Parameters::suffix_o.

Definition at line 1633 of file parameters.cpp.

int Parameters::get_topo ( ) const

Gives the value corresponding to the topography.

Returns

The value corresponding to the topography Parameters::topo.

Definition at line 1303 of file parameters.cpp.

string Parameters::get_topographyNameFile (void) const

Gives the topography path + Input directory.

Returns

The topography path + Input directory Parameters::topography_namefile.

Definition at line 1283 of file parameters.cpp.

string Parameters::get_topographyNameFileS (void) const

Gives the topography namefile (inside the Input directory)

Returns

The topography namefile (inside the Input directory) Parameters::topo_NF.

Definition at line 1293 of file parameters.cpp.

SCALAR Parameters::get_tx ( ) const

Gives the value of dt/dx.

Returns

The value of dt/dx Parameters::tx.

Definition at line 1123 of file parameters.cpp.

SCALAR Parameters::get_zcrust_coef ( ) const

Gives the value of the zcrust coefficient.

Returns

The value of zcrust Parameters::zcrust_coef.

Definition at line 1553 of file parameters.cpp.

int Parameters::get_zcrust_init ( ) const

Gives the value corresponding to the initialization of zcrust.

Returns

The value corresponding to the initialization of zcrust Parameters::zcrust_init.

Definition at line 1543 of file parameters.cpp.

string Parameters::get_zcrustNameFile (void) const

Gives the zcrust path for the initialization + Input directory.

Returns

The zcrust path for the initialization + Input directory Parameters::zcrust_namefile.

Definition at line 1563 of file parameters.cpp.

string Parameters::get_zcrustNameFileS ( ) const

Gives the zcrust namefile (inside the Input directory)

Returns

The zcrust namefile for the initialization (inside the Input directory) Parameters::zcrust_NF.

Definition at line 1573 of file parameters.cpp.

void Parameters::setparameters (const char * *FILENAME*)

Sets the parameters.

Gets all the parameters from the file FILENAME, check and affect them. The values used by FullSWOF_1D are saved in the file parameters.dat. These values are also printed in the terminal when the code is run.

Parameters

in	*FILENAME*	name of the parameters file.

Warning

parameters.txt: ERROR: ***.
parameters.txt: WARNING: ***.
ERROR: the *** file *** does not exists in the directory Inputs.
Impossible to open the *** file. Verify if the directory *** exists.

Note

If a value cannot be affected correctly, the code will exit with failure termination code.
If parameters.dat cannot be opened, the code will exit with failure termination code.

Definition at line 63 of file parameters.cpp.

5.51.4 Member Data Documentation

SCALAR Parameters::amortENO [protected]

Parameter for eno.

Definition at line 326 of file parameters.hpp.

SCALAR Parameters::cfl [protected]

CFL value.
Definition at line 282 of file parameters.hpp.

SCALAR Parameters::dt [protected]

Time step.
Definition at line 274 of file parameters.hpp.

SCALAR Parameters::dtheta_coef [protected]

Value of dtheta.
Definition at line 336 of file parameters.hpp.

int Parameters::dtheta_init [protected]

Type of initialization of dtheta.
Definition at line 318 of file parameters.hpp.

string Parameters::dtheta_namefile [protected]

Name of the file for dtheta: Inputs/file.
Definition at line 364 of file parameters.hpp.

string Parameters::dtheta_NF [protected]

Name of the file for dtheta without 'Inputs'.
Definition at line 366 of file parameters.hpp.

SCALAR Parameters::dx [protected]

Space step.
Definition at line 272 of file parameters.hpp.

int Parameters::flux [protected]

Numerical flux.
Definition at line 296 of file parameters.hpp.

int Parameters::fric [protected]

Friction.
Definition at line 302 of file parameters.hpp.

SCALAR Parameters::friccoef [protected]

Friction coefficient.
Definition at line 330 of file parameters.hpp.

int Parameters::hu_init [protected]

Type of initial conditions for h and u.
Definition at line 308 of file parameters.hpp.

string Parameters::hu_namefile [protected]

Name of the file for the initialization of h and u: Inputs/file.
Definition at line 348 of file parameters.hpp.

string Parameters::hu_NF [protected]

Name of the file for the initialization of h and u without 'Inputs'.
Definition at line 350 of file parameters.hpp.

SCALAR Parameters::imax_coef [protected]

Value of imax.
Definition at line 342 of file parameters.hpp.

int Parameters::imax_init [protected]

Type of initialization of imax.
Definition at line 324 of file parameters.hpp.

string Parameters::imax_namefile [protected]

Name of the file for imax: Inputs/file.
Definition at line 376 of file parameters.hpp.

string Parameters::imax_NF [protected]

Name of the file for imax without 'Inputs'.
Definition at line 378 of file parameters.hpp.

int Parameters::inf [protected]

Type of infiltration.
Definition at line 312 of file parameters.hpp.

SCALAR Parameters::Kc_coef [protected]

Value of Kc.
Definition at line 332 of file parameters.hpp.

int Parameters::Kc_init [protected]

Type of initialization of Kc.
Definition at line 314 of file parameters.hpp.

string Parameters::Kc_namefile [protected]

Name of the file for Kc: Inputs/file.
Definition at line 356 of file parameters.hpp.

string Parameters::Kc_NF [protected]

Name of the file for Kc without 'Inputs'.
Definition at line 358 of file parameters.hpp.

SCALAR Parameters::Ks_coef [protected]

Value of Ks.
Definition at line 334 of file parameters.hpp.

int Parameters::Ks_init [protected]

Type of initialization of Ks.
Definition at line 316 of file parameters.hpp.

string Parameters::Ks_namefile [protected]

Name of the file for Ks: Inputs/file.
Definition at line 360 of file parameters.hpp.

string Parameters::Ks_NF [protected]

Name of the file for Ks without 'Inputs'.
Definition at line 362 of file parameters.hpp.

SCALAR Parameters::L [protected]

Length of the domain.
Definition at line 278 of file parameters.hpp.

SCALAR Parameters::L_imp_h [protected]

Imposed water height on the left boundary.
Definition at line 290 of file parameters.hpp.

SCALAR Parameters::L_imp_q [protected]

Imposed discharge on the left boundary.
Definition at line 288 of file parameters.hpp.

int Parameters::Lbound [protected]

Left boundary condition.
Definition at line 284 of file parameters.hpp.

int Parameters::lim [protected]

Slope limiter.
Definition at line 304 of file parameters.hpp.

int Parameters::m [protected]

Number of time steps.
Definition at line 268 of file parameters.hpp.

SCALAR Parameters::modifENO [protected]

Parameter for eno_modif.
Definition at line 328 of file parameters.hpp.

int Parameters::nbtimes [protected]

Number of times saved.
Definition at line 270 of file parameters.hpp.

int Parameters::Nxcell [protected]

Number of cells in space.
Definition at line 266 of file parameters.hpp.

int Parameters::order [protected]

Order of the numerical scheme.
Definition at line 298 of file parameters.hpp.

string Parameters::output_directory [protected]

Name of the output directory Outputs+suffix.
Definition at line 380 of file parameters.hpp.

SCALAR Parameters::Psi_coef [protected]

Value of Psi.
Definition at line 338 of file parameters.hpp.

int Parameters::Psi_init [protected]

Type of initialization of Psi.
Definition at line 320 of file parameters.hpp.

string Parameters::Psi_namefile [protected]

Name of the file for Psi: Inputs/file.
Definition at line 368 of file parameters.hpp.

string Parameters::Psi_NF [protected]

Name of the file for Psi without 'Inputs'.
Definition at line 370 of file parameters.hpp.

SCALAR Parameters::R_imp_h [protected]

Imposed water height on the right boundary.
Definition at line 294 of file parameters.hpp.

SCALAR Parameters::R_imp_q [protected]

Imposed discharge on the right boundary.
Definition at line 292 of file parameters.hpp.

int Parameters::rain [protected]

Type of rain.
Definition at line 310 of file parameters.hpp.

string Parameters::rain_namefile [protected]

Name of the file for the rain: Inputs/file.
Definition at line 352 of file parameters.hpp.

string Parameters::rain_NF [protected]

Name of the file for the rain without 'Inputs'.
Definition at line 354 of file parameters.hpp.

int Parameters::Rbound [protected]

Right boundary condition.
Definition at line 286 of file parameters.hpp.

int Parameters::rec [protected]

Reconstruction.
Definition at line 300 of file parameters.hpp.

string Parameters::suffix_o [protected]

Suffix for the output directory.
Definition at line 382 of file parameters.hpp.

SCALAR Parameters::T [protected]

Final time.
Definition at line 280 of file parameters.hpp.

int Parameters::topo [protected]

Type of topography.
Definition at line 306 of file parameters.hpp.

string Parameters::topo_NF [protected]

Name of the file for the topography without 'Inputs'.
Definition at line 346 of file parameters.hpp.

string Parameters::topography_namefile [protected]

Name of the file for the topography: Inputs/file.
Definition at line 344 of file parameters.hpp.

SCALAR Parameters::tx [protected]

Ratio dt/dx.
Definition at line 276 of file parameters.hpp.

SCALAR Parameters::zcrust_coef [protected]

Value of zcrust.
Definition at line 340 of file parameters.hpp.

int Parameters::zcrust_init [protected]

Type of initialization of zcrust.
Definition at line 322 of file parameters.hpp.

string Parameters::zcrust_namefile [protected]

Name of the file for zcrust: Inputs/file.
Definition at line 372 of file parameters.hpp.

string Parameters::zcrust_NF [protected]

Name of the file for zcrust without 'Inputs'.
Definition at line 374 of file parameters.hpp.
The documentation for this class was generated from the following files:

- Headers/libparameters/parameters.hpp
- Sources/libparameters/parameters.cpp

5.52 Parser Class Reference

Parser to read the entries
`#include <parser.hpp>`

Public Member Functions

- Parser (const char *)
  Constructor.
- string GetValue (const char *)
  Returns the value of the variable.
- virtual ~Parser ()
  Destructor.

5.52.1 Detailed Description

Parser to read the entries
Class that reads the input file writen as description <variable>:: value # comment and keep the values after the "::" ignoring the comments that begin with a "#".
Definition at line 79 of file parser.hpp.

5.52.2 Constructor & Destructor Documentation

Parser::Parser (const char * *FILENAME*)

Constructor.
Constructor: reads the input parameter and copy the data in a tabular.

Parameters

in	*FILENAME*	name of the paramters file.

Warning

Impossible to open the *** file.

Note

If the parameters file cannot be opened, the code will exit with failure termination code.

Definition at line 57 of file parser.cpp.

Parser::~Parser ( ) [virtual]

Destructor.

Definition at line 161 of file parser.cpp.

5.52.3 Member Function Documentation

string Parser::GetValue (const char * *TAG*)

Returns the value of the variable.

Return the value corresponding to the tag.

Parameters

in	*TAG*	name of the variable with delimiters.

Warning

No entry for the variable ***.
Bad syntax for ***. The syntax is: description <variable>:: value

Returns

Value of the variable as a string

Note

If the value cannot be read correctly, the code will exit with failure termination code.

Definition at line 113 of file parser.cpp.

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

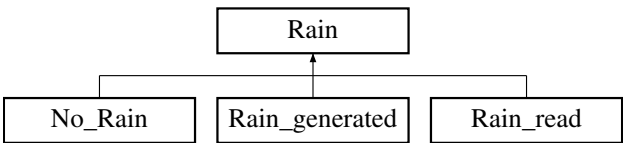
- Headers/libparser/parser.hpp
- Sources/libparser/parser.cpp

5.53 Rain Class Reference

Initialization of the rain.

`#include <rain.hpp>`

Inheritance diagram for Rain:



Public Member Functions

- Rain (Parameters &)

  Constructor.

- virtual void rain_func (SCALAR, VECT &)=0

  Function to be specified in each case.

- virtual ~Rain ()

  Destructor.

Protected Attributes

- const int NXCELL
- const SCALAR DX

5.53.1 Detailed Description

Initialization of the rain.

Class that contains all the common declarations for the initialization of the rain.

Definition at line 69 of file rain.hpp.

5.53.2 Constructor & Destructor Documentation

Rain::Rain (Parameters & *par*)

Constructor.

Defines the number of cells and the space step.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 57 of file rain.cpp.

Rain::~Rain ( ) [virtual]

Destructor.

Definition at line 68 of file rain.cpp.

5.53.3 Member Function Documentation

virtual void Rain::rain_func (SCALAR , VECT &) [pure virtual]

Function to be specified in each case.

Implemented in Rain_read, Rain_generated, and No_Rain.

5.53.4 Member Data Documentation

const SCALAR Rain::DX [protected]

Space step (unused).

Definition at line 86 of file rain.hpp.

const int Rain::NXCELL [protected]

Number of cells in space.

Definition at line 84 of file rain.hpp.

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

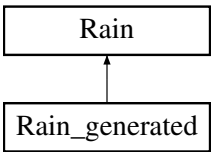
- Headers/librain_infiltration/rain.hpp
- Sources/librain_infiltration/rain.cpp

5.54 Rain_generated Class Reference

Constant rain configuration.

`#include <rain_generated.hpp>`

Inheritance diagram for Rain_generated:



Public Member Functions

- Rain_generated (Parameters &)

  Constructor.
- void rain_func (SCALAR, VECT &)

  Performs the constant initialization.
- virtual ~Rain_generated ()

  Destructor.

Additional Inherited Members

5.54.1 Detailed Description

Constant rain configuration.

Class that initializes a constant rain, with value 0.00001 m/s = 36 mm/h.

Definition at line 71 of file rain_generated.hpp.

5.54.2 Constructor & Destructor Documentation

Rain_generated::Rain_generated (Parameters & *par*)

Constructor.

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 59 of file rain_generated.cpp.

Rain_generated::~Rain_generated ( ) [virtual]

Destructor.

Definition at line 85 of file rain_generated.cpp.

5.54.3 Member Function Documentation

void Rain_generated::rain_func (SCALAR *time,* VECT & *Tab_rain*) [virtual]

Performs the constant initialization.

Initializes the rain to 0.00001 m/s = 36 mm/h.

Parameters

in	*time*	the current time (unused)
in,out	*Tab_rain*	rain intensity at the current time on each cell.

Implements Rain.

Definition at line 68 of file rain_generated.cpp.

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

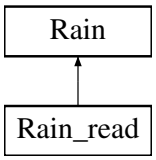
- Headers/librain_infiltration/rain_generated.hpp
- Sources/librain_infiltration/rain_generated.cpp

5.55 Rain_read Class Reference

File configuration.

`#include <rain_read.hpp>`

Inheritance diagram for Rain_read:



Public Member Functions

- Rain_read (Parameters &)

  Constructor.
- void rain_func (SCALAR, VECT &)

  Performs the initialization.
- virtual ~Rain_read ()

  Destructor.

Additional Inherited Members

5.55.1 Detailed Description

File configuration.

Class that initializes the rain to the values read in a file.

Definition at line 71 of file rain_read.hpp.

5.55.2 Constructor & Destructor Documentation

Rain_read::Rain_read (Parameters & *par*)

Constructor.

Defines the name of the file for the initialization and creates two tables (times and intensity) from the data read in the file.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Warning

(rain_namefile): ERROR: cannot open the rain file.
(rain_namefile): ERROR: line ***.
(rain_namefile): ERROR: the first time must be t = 0.

Definition at line 59 of file rain_read.cpp.

Rain_read::~Rain_read ( ) [virtual]

Destructor.

Definition at line 153 of file rain_read.cpp.

5.55.3 Member Function Documentation

void Rain_read::rain_func (SCALAR *time,* VECT & *Tab_rain*) [virtual]

Performs the initialization.

Initializes the rain to the values read in the corresponding file.

Parameters

in	*time*	current time.
in,out	*Tab_rain*	rain intensity at the current time on each cell.

Note

As the times read in the file must start with t = 0, Tab_rain is initialized.

Implements Rain.

Definition at line 133 of file rain_read.cpp.

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

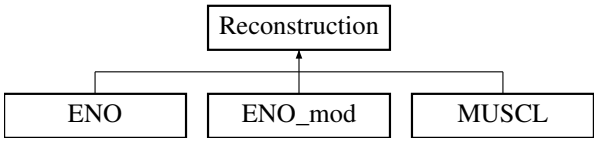
- Headers/librain_infiltration/rain_read.hpp
- Sources/librain_infiltration/rain_read.cpp

5.56 Reconstruction Class Reference

Reconstruction of the variables

`#include <reconstruction.hpp>`

Inheritance diagram for Reconstruction:



Public Member Functions

- Reconstruction (Parameters &, VECT)

  Constructor.
- virtual void calc (VECT, VECT, VECT, VECT &, VECT &, VECT &, VECT &, VECT &, VECT &)=0

  Function to be specified in each reconstruction.
- virtual ∼Reconstruction ()

  Destructor.

Protected Attributes

- const int NXCELL
- VECT zr
- VECT zl
- VECT delta0_z
- Choice_limiter ∗ limiter

5.56.1 Detailed Description

Reconstruction of the variables

Class that contains all the common declarations for the second order reconstruction in space.

Definition at line 73 of file reconstruction.hpp.

5.56.2 Constructor & Destructor Documentation

Reconstruction::Reconstruction (Parameters & *par,* VECT *z*)

Constructor.

Defines the number of cells, the slope limiter, and initializes Reconstruction::zl, Reconstruction::zr, Reconstruction::delta0_z.

Parameters

in	*par*	parameter, contains all the values from the parameters file.
in	*z*	topography.

Warning

Problem: allocation of ∗∗∗ failed.

Note

If a vector cannot be allocated, the code will exit with failure termination code.

Definition at line 58 of file reconstruction.cpp.

Reconstruction::∼Reconstruction ( ) [virtual]

Destructor.

Definition at line 97 of file reconstruction.cpp.

5.56.3 Member Function Documentation

virtual void Reconstruction::calc (VECT , VECT , VECT , VECT & , VECT & , VECT & , VECT & , VECT & , VECT &) [pure virtual]

Function to be specified in each reconstruction.

Implemented in ENO, MUSCL, and ENO_mod.

5.56.4 Member Data Documentation

VECT Reconstruction::delta0_z [protected]

Difference between the values of the topography on two adjacent cells (on the right)
Definition at line 95 of file reconstruction.hpp.

Choice_limiter* Reconstruction::limiter [protected]

Slope limiter
Definition at line 97 of file reconstruction.hpp.

const int Reconstruction::NXCELL [protected]

Number of cells in space
Definition at line 89 of file reconstruction.hpp.

VECT Reconstruction::zl [protected]

Reconstructed topography on the left boundary
Definition at line 93 of file reconstruction.hpp.

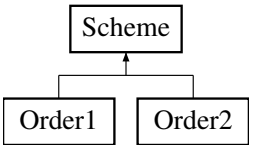
VECT Reconstruction::zr [protected]

Reconstructed topography on the right boundary
Definition at line 91 of file reconstruction.hpp.
The documentation for this class was generated from the following files:

- Headers/libreconstructions/reconstruction.hpp
- Sources/libreconstructions/reconstruction.cpp

5.57 Scheme Class Reference

Numerical scheme.
`#include <scheme.hpp>`
Inheritance diagram for Scheme:



Public Member Functions

- Scheme (Parameters &)
  Constructor.
- virtual void calc ()=0
  Function to be specified in each numerical scheme.
- void allocation ()
- void deallocation ()
- void maincalc (VECT, VECT, SCALAR, VECT &, VECT &, VECT &, SCALAR &, SCALAR &, VECT &)
  Main calculation of the scheme.
- SCALAR froude_number (VECT, VECT)

Computation of the mean value of the Froude number.

- void boundary (VECT &, VECT &, const SCALAR, const SCALAR, const SCALAR, const SCALAR, SCALAR, const int)

  Calls the boundary conditions and affects the boundary values.

- virtual ~Scheme ()

  Destructor.

Protected Attributes

- const int NXCELL
- const int M
- const SCALAR DX
- const SCALAR DT
- const SCALAR TX
- const int NBTIMES
- const SCALAR CFL
- const SCALAR L_IMP_Q
- const SCALAR L_IMP_H
- const SCALAR R_IMP_Q
- const SCALAR R_IMP_H
- const int ORDER
- int nbt
- VECT h
- VECT u
- VECT q
- VECT z
- VECT rain
- VECT Vin_tot
- VECT delta_z
- VECT dzi
- VECT f1
- VECT f2
- VECT hs
- VECT us
- VECT qs
- VECT hl
- VECT hr
- VECT ul
- VECT ur
- VECT hleft
- VECT hright
- SCALAR flux_l
- SCALAR flux_r
- SCALAR cum_flux_l
- SCALAR cum_flux_r
- SCALAR Vol_rain_tot
- SCALAR Total_volume_outflow
- SCALAR height_of_tot
- SCALAR height_inf_tot

- SCALAR Vol_inf_tot
- SCALAR Vol_of_tot
- SCALAR Fr
- int time_initial
- time_t start
- time_t end
- SCALAR elapsed_time
- clock_t cpu_time
- Choice_condition * Lbound
- Choice_condition * Rbound
- Choice_output * out

5.57.1 Detailed Description

Numerical scheme.

Class that contains all the common declarations for the numerical schemes.

Definition at line 105 of file scheme.hpp.

5.57.2 Constructor & Destructor Documentation

Scheme::Scheme (Parameters & *par*)

Constructor.

Initializations and allocations.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 58 of file scheme.cpp.

Scheme::~Scheme ( ) [virtual]

Destructor.

Definition at line 249 of file scheme.cpp.

5.57.3 Member Function Documentation

void Scheme::allocation ( )

Allocation of spatialized variables

Warning

Problem: allocation of *** failed.

Note

If a vector cannot be allocated, the code will exit with failure termination code.

Definition at line 257 of file scheme.cpp.

void Scheme::boundary (VECT & *h_tmp,* VECT & *u_tmp,* const SCALAR *L_IMP_Q,* const SCALAR *L_IMP_H,* const SCALAR *R_IMP_Q,* const SCALAR *R_IMP_H,* SCALAR *time_tmp,* const int *NODEX*)

Calls the boundary conditions and affects the boundary values.

Parameters

in,out	*h_tmp*	water height.
in,out	*u_tmp*	velocity.
in	*L_IMP_Q*	left imposed discharge.
in	*L_IMP_H*	left imposed water height.
in	*R_IMP_Q*	right imposed discharge.
in	*R_IMP_H*	right imposed water height.
in	*time_tmp*	current time.
in	*NODEX*	number of space cells.

Definition at line 194 of file scheme.cpp.

virtual void Scheme::calc ( ) [pure virtual]

Function to be specified in each numerical scheme.

Implemented in Order1, and Order2.

void Scheme::deallocation ( )

Deallocation of variables

Definition at line 381 of file scheme.cpp.

SCALAR Scheme::froude_number (VECT *h*, VECT *u*)

Computation of the mean value of the Froude number.

Mean value in space of the Froude number at the final time.

Parameters

in	*h*	water height.
in	*u*	velocity.

Returns

The mean Froude number $\frac{u}{\sqrt{gh}}$.

Definition at line 218 of file scheme.cpp.

void Scheme::maincalc (VECT *he*, VECT *ve*, SCALAR *time*, VECT & *hes*, VECT & *ves*, VECT & *qes*, SCALAR & *flux_l*, SCALAR & *flux_r*, VECT & *Vin*)

Main calculation of the scheme.

This calculation is called once at the order 1, and twice at the second order.

Parameters

in	*he*	water height.
in	*ve*	velocity.
in	*time*	time to be attained at the end of the loop.
out	*hes*	water height after one step of the scheme.
out	*ves*	velocity after one step of the scheme.
out	*qes*	discharge after one step of the scheme.

out	*flux_l*	Flux on the left.
out	*flux_r*	Flux on the right.
in,out	*Vin*	infiltrated volume.

Warning

the CFL condition is not satisfied: CFL $>$ ***

Todo Improve the treatment of numerical errors.

Definition at line 115 of file scheme.cpp.

5.57.4 Member Data Documentation

const SCALAR Scheme::CFL [protected]

CFL value.
Definition at line 148 of file scheme.hpp.

clock_t Scheme::cpu_time [protected]

CPU time.
Definition at line 230 of file scheme.hpp.

SCALAR Scheme::cum_flux_l [protected]

Cumulative flux on the left (m^2).
Definition at line 204 of file scheme.hpp.

SCALAR Scheme::cum_flux_r [protected]

Cumulative flux on the right (m^2).
Definition at line 206 of file scheme.hpp.

VECT Scheme::delta_z [protected]

Variations of the topography.
Definition at line 174 of file scheme.hpp.

const SCALAR Scheme::DT [protected]

Time step.
Definition at line 142 of file scheme.hpp.

const SCALAR Scheme::DX [protected]

Space step.
Definition at line 140 of file scheme.hpp.

VECT Scheme::dzi [protected]

Difference between the reconstructed topographies on the left and on the right boundary of a cell.
Definition at line 176 of file scheme.hpp.

SCALAR Scheme::elapsed_time [protected]

Duration of the computation.
Definition at line 228 of file scheme.hpp.

time_t Scheme::end [protected]

End of timer.
Definition at line 226 of file scheme.hpp.

VECT Scheme::f1 [protected]

First component of the numerical flux.
Definition at line 178 of file scheme.hpp.

VECT Scheme::f2 [protected]

Second component of the numerical flux.
Definition at line 180 of file scheme.hpp.

SCALAR Scheme::flux_l [protected]

Flux on the left (m^2/s).
Definition at line 200 of file scheme.hpp.

SCALAR Scheme::flux_r [protected]

Flux on the right (m^2/s).
Definition at line 202 of file scheme.hpp.

SCALAR Scheme::Fr [protected]

Mean Froude number.
Definition at line 220 of file scheme.hpp.

VECT Scheme::h [protected]

Water height.
Definition at line 162 of file scheme.hpp.

SCALAR Scheme::height_inf_tot [protected]

Cumulative height of infiltrated volume on the whole domain
Definition at line 214 of file scheme.hpp.

SCALAR Scheme::height_of_tot [protected]

Cumulative water height on the whole domain
Definition at line 212 of file scheme.hpp.

VECT Scheme::hl [protected]

Water height on the cell located at the left of the boundary.
Definition at line 188 of file scheme.hpp.

VECT Scheme::hleft [protected]

Hydrostatic reconstruction on the left.
Definition at line 196 of file scheme.hpp.

VECT Scheme::hr [protected]

Water height on the cell located at the right of the boundary.
Definition at line 190 of file scheme.hpp.

VECT Scheme::hright [protected]

Hydrostatic reconstruction on the right.
Definition at line 198 of file scheme.hpp.

VECT Scheme::hs [protected]

Water height after one step of the scheme.
Definition at line 182 of file scheme.hpp.

const SCALAR Scheme::L_IMP_H [protected]

Imposed water height on the left boundary.
Definition at line 152 of file scheme.hpp.

const SCALAR Scheme::L_IMP_Q [protected]

Imposed discharge on the left boundary.
Definition at line 150 of file scheme.hpp.

Choice_condition* Scheme::Lbound [protected]

The choice of the left boundary condition.
Definition at line 232 of file scheme.hpp.

const int Scheme::M [protected]

Number of time steps.
Definition at line 138 of file scheme.hpp.

int Scheme::nbt [protected]

Number of time steps between two savings.
Definition at line 160 of file scheme.hpp.

const int Scheme::NBTIMES [protected]

Number of times saved.
Definition at line 146 of file scheme.hpp.

const int Scheme::NXCELL [protected]

Number of cells in space.
Definition at line 136 of file scheme.hpp.

const int Scheme::ORDER [protected]

Order of the scheme.
Definition at line 158 of file scheme.hpp.

Choice_output* Scheme::out [protected]

The choice of output.
Definition at line 236 of file scheme.hpp.

VECT Scheme::q [protected]

Discharge.
Definition at line 166 of file scheme.hpp.

VECT Scheme::qs [protected]

Discharge after one step of the scheme.
Definition at line 186 of file scheme.hpp.

const SCALAR Scheme::R_IMP_H [protected]

Imposed water height on the right boundary.
Definition at line 156 of file scheme.hpp.

const SCALAR Scheme::R_IMP_Q [protected]

Imposed discharge on the right boundary.
Definition at line 154 of file scheme.hpp.

VECT Scheme::rain [protected]

Rain.
Definition at line 170 of file scheme.hpp.

Choice_condition* Scheme::Rbound [protected]

The choice of the right boundary condition.
Definition at line 234 of file scheme.hpp.

time_t Scheme::start [protected]

Beginning of timer.
Definition at line 224 of file scheme.hpp.

int Scheme::time_initial [protected]

Initial time: the initial time is time_initial * dt.
Definition at line 222 of file scheme.hpp.

SCALAR Scheme::Total_volume_outflow [protected]

Cumulative outflow volume at the boundary
Definition at line 210 of file scheme.hpp.

const SCALAR Scheme::TX [protected]

Ratio dt/dx.
Definition at line 144 of file scheme.hpp.

VECT Scheme::u [protected]

Velocity.
Definition at line 164 of file scheme.hpp.

VECT Scheme::ul [protected]

Velocity on the cell located at the left of the boundary.
Definition at line 192 of file scheme.hpp.

VECT Scheme::ur [protected]

Velocity on the cell located at the right of the boundary.
Definition at line 194 of file scheme.hpp.

VECT Scheme::us [protected]

Velocity after one step of the scheme.
Definition at line 184 of file scheme.hpp.

VECT Scheme::Vin_tot [protected]

Volume of infiltrated water at each point during one time step.
Definition at line 172 of file scheme.hpp.

SCALAR Scheme::Vol_inf_tot [protected]

Cumulative Volume of water infiltrated.
Definition at line 216 of file scheme.hpp.

SCALAR Scheme::Vol_of_tot [protected]

Cumulative stream volume.
Definition at line 218 of file scheme.hpp.

SCALAR Scheme::Vol_rain_tot [protected]

Cumulative Volume of rain on the whole domain.
Definition at line 208 of file scheme.hpp.

VECT Scheme::z [protected]

Topography.
Definition at line 168 of file scheme.hpp.
The documentation for this class was generated from the following files:

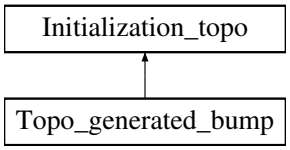
- Headers/libschemes/scheme.hpp
- Sources/libschemes/scheme.cpp

5.58 Topo_generated_bump Class Reference

Bump configuration.

`#include <topo_generated_bump.hpp>`

Inheritance diagram for Topo_generated_bump:



Public Member Functions

- Topo_generated_bump (Parameters &)

  Constructor.
- void initialization (VECT &)

  Performs the initialization.
- virtual ∼Topo_generated_bump ()

  Destructor.

Additional Inherited Members

5.58.1 Detailed Description

Bump configuration.

Class that initializes a bump topography.

Definition at line 69 of file topo_generated_bump.hpp.

5.58.2 Constructor & Destructor Documentation

Topo_generated_bump::Topo_generated_bump (Parameters & *par*)

Constructor.

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 58 of file topo_generated_bump.cpp.

Topo_generated_bump::∼Topo_generated_bump ( ) [virtual]

Destructor.

Definition at line 78 of file topo_generated_bump.cpp.

5.58.3 Member Function Documentation

void Topo_generated_bump::initialization (VECT & *z*) [virtual]

Performs the initialization.

Initializes the topography to $0.2 - 0.005(x-10)^2$ if $x \in [8,12]$, and 0 outside the bump, see Goutal and Maurel [1997].

Parameters

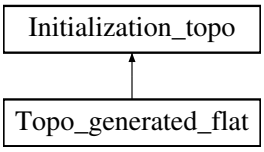
in,out	*z*	topography.

Implements Initialization_topo.
Definition at line 65 of file topo_generated_bump.cpp.
The documentation for this class was generated from the following files:

- Headers/libinitializations/topo_generated_bump.hpp
- Sources/libinitializations/topo_generated_bump.cpp

5.59 Topo_generated_flat Class Reference

Flat configuration.
`#include <topo_generated_flat.hpp>`
Inheritance diagram for Topo_generated_flat:



Public Member Functions

- Topo_generated_flat (Parameters &)
  Constructor.
- void initialization (VECT &)
  Performs the initialization.
- virtual ~Topo_generated_flat ()
  Destructor.

Additional Inherited Members

5.59.1 Detailed Description

Flat configuration.
Class that initializes a flat topography, with value 0.
Definition at line 70 of file topo_generated_flat.hpp.

5.59.2 Constructor & Destructor Documentation

Topo_generated_flat::Topo_generated_flat (Parameters & *par*)

Constructor.
Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 59 of file topo_generated_flat.cpp.

Topo_generated_flat::~Topo_generated_flat ( ) [virtual]

Destructor.
Definition at line 80 of file topo_generated_flat.cpp.

5.59.3 Member Function Documentation

void Topo_generated_flat::initialization (VECT & *z*) [virtual]

Performs the initialization.

Initializes the topography to 0.

Parameters

in,out	*z*	topography.

Implements Initialization_topo.

Definition at line 67 of file topo_generated_flat.cpp.

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

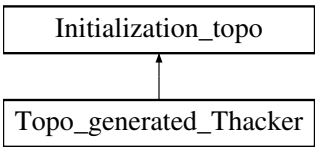
- Headers/libinitializations/topo_generated_flat.hpp
- Sources/libinitializations/topo_generated_flat.cpp

5.60 Topo_generated_Thacker Class Reference

Thacker configuration.

`#include <topo_generated_thacker.hpp>`

Inheritance diagram for Topo_generated_Thacker:



Public Member Functions

- Topo_generated_Thacker (Parameters &)

  Constructor.
- void initialization (VECT &)

  Performs the initialization.
- virtual ~Topo_generated_Thacker ()

  Destructor.

Additional Inherited Members

5.60.1 Detailed Description

Thacker configuration.

Class that initializes a parabolic topography for Thacker's benchmark.

Definition at line 70 of file topo_generated_thacker.hpp.

5.60.2 Constructor & Destructor Documentation

Topo_generated_Thacker::Topo_generated_Thacker (Parameters & *par*)

Constructor.

Defines the parameter h0 and a of the parabola.

Parameters

in	*par*	parameter, contains all the values from the parameters file (unused).

Definition at line 58 of file topo_generated_thacker.cpp.

Topo_generated_Thacker::~Topo_generated_Thacker ( ) [virtual]

Destructor.

Definition at line 87 of file topo_generated_thacker.cpp.

5.60.3 Member Function Documentation

void Topo_generated_Thacker::initialization (VECT & *z*) [virtual]

Performs the initialization.

Initializes the topography to $h_0 \left(\frac{(x-L/2)^2}{a^2} - 1 \right)$, see Thacker [1981].

Parameters

in,out	*z*	topography.

Implements Initialization_topo.

Definition at line 70 of file topo_generated_thacker.cpp.

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

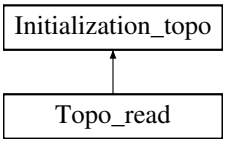
- Headers/libinitializations/topo_generated_thacker.hpp
- Sources/libinitializations/topo_generated_thacker.cpp

5.61 Topo_read Class Reference

File configuration.

`#include <topo_read.hpp>`

Inheritance diagram for Topo_read:



Public Member Functions

- Topo_read (Parameters &)

  Constructor.
- void initialization (VECT &)

  Performs the initialization.
- virtual ~Topo_read ()

  Destructor.

Additional Inherited Members

5.61.1 Detailed Description

File configuration.

Class that initializes the topography to the values read in a file.

Definition at line 70 of file topo_read.hpp.

5.61.2 Constructor & Destructor Documentation

Topo_read::Topo_read (Parameters & *par*)

Constructor.

Defines the name of the file for the initialization.

Parameters

in	*par*	parameter, contains all the values from the parameters file.

Definition at line 59 of file topo_read.cpp.

Topo_read::~Topo_read ( ) [virtual]

Destructor.

Definition at line 168 of file topo_read.cpp.

5.61.3 Member Function Documentation

void Topo_read::initialization (VECT & *z*) [virtual]

Performs the initialization.

Initializes the topography to the values read in the corresponding file.

Parameters

in,out	*z*	topography.

Warning

(topography_namefile): ERROR: cannot open the topography file.
(topography_namefile): ERROR: the number of data in this file is too big
(topography_namefile): ERROR: line ***.
(topography_namefile): WARNING: line ***.
(topography_namefile): ERROR: the number of data in this file is too small
(topography_namefile): ERROR: the value for the point x *** is missing

Note

If the file cannot be opened or if the data are not correct, the code will exit with failure termination code.

Implements Initialization_topo.

Definition at line 70 of file topo_read.cpp.

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

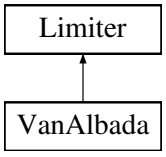
- Headers/libinitializations/topo_read.hpp
- Sources/libinitializations/topo_read.cpp

5.62 VanAlbada Class Reference

Van Albada slope limiter.

`#include <vanalbada.hpp>`

Inheritance diagram for VanAlbada:



Public Member Functions

- VanAlbada ()

  Constructor.
- void calc (SCALAR, SCALAR)

  Calculates the value of the slope limiter.
- virtual ∼VanAlbada ()

  Destructor.

Additional Inherited Members

5.62.1 Detailed Description

Van Albada slope limiter.

Class that calculates Van Albada slope limiter.

Definition at line 69 of file vanalbada.hpp.

5.62.2 Constructor & Destructor Documentation

VanAlbada::VanAlbada ( )

Constructor.

Definition at line 58 of file vanalbada.cpp.

VanAlbada::∼VanAlbada ( ) [virtual]

Destructor.

Definition at line 84 of file vanalbada.cpp.

5.62.3 Member Function Documentation

void VanAlbada::calc (SCALAR *a*, SCALAR *b*) [virtual]

Calculates the value of the slope limiter.

Van Albada function:

$$\mathrm{VA}(x,y) = \begin{cases} 0 & \text{if } \mathrm{sign}(x) \neq \mathrm{sign}(y), \\ \dfrac{x(y^2+\varepsilon)+y(x^2+\varepsilon)}{x^2+y^2+2\varepsilon} & \text{else,} \end{cases}$$

with $0 \leq \varepsilon \ll 1$.

Parameters

in	*a*	slope on the left of the cell.
in	*b*	slope on the right of the cell.

Modifies

Limiter::rec recontructed value.

Implements Limiter.

Definition at line 61 of file vanalbada.cpp.

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

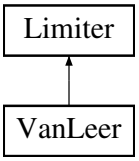
- Headers/liblimitations/vanalbada.hpp
- Sources/liblimitations/vanalbada.cpp

5.63 VanLeer Class Reference

Van Leer slope limiter.

`#include <vanleer.hpp>`

Inheritance diagram for VanLeer:



Public Member Functions

- VanLeer ()

  Constructor.
- void calc (SCALAR, SCALAR)

  Calculates the value of the slope limiter.
- virtual ∼VanLeer ()

  Destructor.

Additional Inherited Members

5.63.1 Detailed Description

Van Leer slope limiter.

Class that calculates Van Leer slope limiter.

Definition at line 69 of file vanleer.hpp.

5.63.2 Constructor & Destructor Documentation

VanLeer::VanLeer ( )

Constructor.

Definition at line 59 of file vanleer.cpp.

VanLeer::∼VanLeer ( ) [virtual]

Destructor.

Definition at line 84 of file vanleer.cpp.

5.63.3 Member Function Documentation

void VanLeer::calc (SCALAR *a*, SCALAR *b*) [virtual]

Calculates the value of the slope limiter.

Van Leer function:

$$\mathrm{VL}(x,y) = \begin{cases} 0 & \text{if } xy \leq 0, \\ \dfrac{2xy}{x+y} & \text{else.} \end{cases}$$

Parameters

in	*a*	slope on the left of the cell.
in	*b*	slope on the right of the cell.

Modifies

Limiter::rec recontructed value.

Implements Limiter.
Definition at line 62 of file vanleer.cpp.
The documentation for this class was generated from the following files:

- Headers/liblimitations/vanleer.hpp
- Sources/liblimitations/vanleer.cpp

Chapter 6

File Documentation

6.1 Headers/libboundaryconditions/bc_imp_discharge.hpp File Reference

Imposed discharge.

```
#include "boundary_condition.hpp"
```

Classes

- class Bc_imp_discharge

  Imposed discharge.

Macros

- #define BC_IMP_DISCHARGE_HPP

6.1.1 Detailed Description

Imposed discharge.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2011-2015)

Version

1.02.02

Date

2015-10-29

Boundary condition: imposed discharge (and water height if necessary).

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6.1.2 Macro Definition Documentation

#define BC_IMP_DISCHARGE_HPP

Definition at line 63 of file bc_imp_discharge.hpp.

6.2 Headers/libboundaryconditions/bc_imp_height.hpp File Reference

Imposed water height.

```
#include "boundary_condition.hpp"
```

Classes

- class Bc_imp_height

  Imposed water height.

6.2.1 Detailed Description

Imposed water height.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Boundary condition: imposed water height (and discharge if necessary), based on the modified method of characteristics and Riemann invariants.

See also

Olivier Delestre Ph.D thesis Annexe A Delestre [2010] http://tel.archives-ouvertes.↩
fr/tel-00587197

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6.3 Headers/libboundaryconditions/bc_neumann.hpp File Reference

Neumann condition.

```
#include "boundary_condition.hpp"
```

Classes

- class Bc_neumann

  Neumann condition.

6.3.1 Detailed Description

Neumann condition.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Boundary condition: Neumann condition (the normal derivative is null).

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6.4 Headers/libboundaryconditions/bc_periodic.hpp File Reference

Periodic condition.

```
#include "boundary_condition.hpp"
```

Classes

- class Bc_periodic

  Periodic condition.

6.4.1 Detailed Description

Periodic condition.

Author

Pierre-Antoine Ksinant pierreantoine.ksinantgarcia@gmail.com (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Boundary condition: periodic condition.

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6.5 Headers/libboundaryconditions/bc_wall.hpp File Reference

Wall condition.

```
#include "boundary_condition.hpp"
```

Classes

- class Bc_wall

  Wall condition.

6.5.1 Detailed Description

Wall condition.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Boundary condition: wall condition (the discharge at the boundary is null).

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6.6 Headers/libboundaryconditions/boundary_condition.hpp File Reference

Boundary condition.

```
#include "parameters.hpp"
```

Classes

- class Boundary_condition

  Boundary condition.

6.6.1 Detailed Description

Boundary condition.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the boundary conditions.

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6.7 Headers/libboundaryconditions/choice_condition.hpp File Reference

Choice of boundary condition.

```
   #include "boundary_condition.hpp"
#include "bc_neumann.hpp"
#include "bc_imp_height.hpp"
#include "bc_imp_discharge.hpp"
#include "bc_wall.hpp"
#include "bc_periodic.hpp"
```

Classes

- class Choice_condition

  Choice of boundary condition.

Macros

- #define CHOICE_CONDITION_HPP

6.7.1 Detailed Description

Choice of boundary condition.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen boundary condition.

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6.7.2 Macro Definition Documentation

#define CHOICE_CONDITION_HPP

Definition at line 82 of file choice_condition.hpp.

6.8 Headers/libflux/choice_flux.hpp File Reference

Choice of numerical flux.

```
   #include "flux.hpp"
#include "f_rusanov.hpp"
#include "f_hll.hpp"
#include "f_hll2.hpp"
#include "f_kinetic.hpp"
#include "f_vfroe.hpp"
```

Classes

- class Choice_flux

  Choice of numerical flux.

Macros

- #define CHOICE_FLUX_HPP

6.8.1 Detailed Description

Choice of numerical flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen numerical flux.

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6.8.2 Macro Definition Documentation

#define CHOICE_FLUX_HPP

Definition at line 83 of file choice_flux.hpp.

6.9 Headers/libflux/f_hll.hpp File Reference

HLL flux.

```
#include "flux.hpp"
```

Classes

- class F_HLL

  HLL flux.

6.9.1 Detailed Description

HLL flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical flux: Harten, Lax, van Leer formulation.

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6.10 Headers/libflux/f_hll2.hpp File Reference

HLL flux.

```
#include "flux.hpp"
```

Classes

- class F_HLL2

  HLL flux.

6.10.1 Detailed Description

HLL flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical flux: Harten, Lax, van Leer reduced formulation.

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6.11 Headers/libflux/f_kinetic.hpp File Reference

Kinetic flux.

```
#include "flux.hpp"
```

Classes

- class F_Kinetic

  Kinetic flux.

6.11.1 Detailed Description

Kinetic flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical flux: kinetic formulation.

Copyright

6.12 Headers/libflux/f_rusanov.hpp File Reference

Rusanov flux.

```
#include "flux.hpp"
```

Classes

- class F_Rusanov

  Rusanov flux.

6.12.1 Detailed Description

Rusanov flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical flux: Rusanov formulation.

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6.13 Headers/libflux/f_vfroe.hpp File Reference

VFRoe flux.

```
#include "flux.hpp"
```

Classes

- class F_VFRoe

  VFRoe flux.

6.13.1 Detailed Description

VFRoe flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical flux: VFRoe-ncv formulation.

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6.14 Headers/libflux/flux.hpp File Reference

Numerical flux.

```
#include "parameters.hpp"
```

Classes

- class Flux

  Numerical flux.

6.14.1 Detailed Description

Numerical flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the numerical fluxes.

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6.15 Headers/libfrictions/choice_friction.hpp File Reference

Choice of friction law.

```
   #include "friction.hpp"
#include "no_friction.hpp"
#include "fr_manning.hpp"
#include "fr_darcy_weisbach.hpp"
#include "fr_laminar.hpp"
```

Classes

- class Choice_friction

  Choice of friction law.

Macros

- #define CHOICE_FRICTION_HPP

6.15.1 Detailed Description

Choice of friction law.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen friction law.

Copyright

6.15.2 Macro Definition Documentation

#define CHOICE_FRICTION_HPP

Definition at line 78 of file choice_friction.hpp.

6.16 Headers/libfrictions/fr_darcy_weisbach.hpp File Reference

Darcy-Weisbach law.

```
#include "friction.hpp"
```

Classes

- class Fr_Darcy_Weisbach

  Darcy-Weisbach law.

6.16.1 Detailed Description

Darcy-Weisbach law.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Friction law: Darcy-Weisbach.

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6.17 Headers/libfrictions/fr_laminar.hpp File Reference

laminar law

```
#include "friction.hpp"
```

Classes

- class Fr_Laminar
  Laminar law.

6.17.1 Detailed Description

laminar law

Author

Carine Lucas carine.lucas@univ-orleans.fr (2014-2015)

Version

1.02.01

Date

2015-03-12

Friction law: laminar.

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6.18 Headers/libfrictions/fr_manning.hpp File Reference

Manning law.

```
#include "friction.hpp"
```

Classes

- class Fr_Manning
  Manning law.

6.18.1 Detailed Description

Manning law.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Friction law: Manning.

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6.19 Headers/libfrictions/friction.hpp File Reference

Friction law

```
#include "parameters.hpp"
```

Classes

- class Friction
  Friction law

6.19.1 Detailed Description

Friction law

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the friction laws.

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6.20 Headers/libfrictions/no_friction.hpp File Reference

No friction.

```
#include "friction.hpp"
```

Classes

- class No_Friction

  No friction.

6.20.1 Detailed Description

No friction.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Friction law: does no computation.

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6.21 Headers/libinitializations/choice_init_hu.hpp File Reference

Choice of initialization for h and u.

```
#include "initialization_hu.hpp"
#include "hu_read.hpp"
#include "hu_generated.hpp"
#include "hu_generated_wet_dam_break.hpp"
#include "hu_generated_dry_dam_break.hpp"
#include "hu_generated_dressler_dam_break.hpp"
#include "hu_generated_thacker.hpp"
```

Classes

- class Choice_init_hu

  Choice of initialization for h and u.

Macros

- #define CHOICE_INIT_HU_HPP

6.21.1 Detailed Description

Choice of initialization for h and u.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen initialization of the water height and of the velocity.

Copyright

6.21.2 Macro Definition Documentation

#define CHOICE_INIT_HU_HPP

Definition at line 87 of file choice_init_hu.hpp.

6.22 Headers/libinitializations/choice_init_topo.hpp File Reference

Choice of initialization for the topography.

```
   #include "initialization_topo.hpp"
#include "topo_read.hpp"
#include "topo_generated_flat.hpp"
#include "topo_generated_thacker.hpp"
#include "topo_generated_bump.hpp"
```

Classes

- class Choice_init_topo

  Choice of initialization for the topography.

Macros

- #define CHOICE_INIT_TOPO_HPP

6.22.1 Detailed Description

Choice of initialization for the topography.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen initialization of the topography.

Copyright

6.22.2 Macro Definition Documentation

#define CHOICE_INIT_TOPO_HPP

Definition at line 78 of file choice_init_topo.hpp.

6.23 Headers/libinitializations/hu_generated.hpp File Reference

No water configuration.

```
#include "initialization_hu.hpp"
```

Classes

- class Hu_generated

  No water configuration.

6.23.1 Detailed Description

No water configuration.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of a dry domain.

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6.24 Headers/libinitializations/hu_generated_dressler_dam_break.hpp File Reference

Dressler dam break configuration.

```
#include "initialization_hu.hpp"
```

Classes

- class Hu_generated_Dressler_Dam_break
  Dressler dam break configuration.

6.24.1 Detailed Description

Dressler dam break configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of a dam break as studied by Dressler (with friction).

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6.25 Headers/libinitializations/hu_generated_dry_dam_break.hpp File Reference

Dry dam break configuration.

```
#include "initialization_hu.hpp"
```

Classes

- class Hu_generated_Dry_Dam_break
  Dry dam break configuration.

6.25.1 Detailed Description

Dry dam break configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of a dam break on a dry domain.

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6.26 Headers/libinitializations/hu_generated_thacker.hpp File Reference

Thacker configuration.

```
#include "initialization_hu.hpp"
```

Classes

- class Hu_generated_Thacker
  Thacker configuration.

6.26.1 Detailed Description

Thacker configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of Thacker's benchmark.

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6.27 Headers/libinitializations/hu_generated_wet_dam_break.hpp File Reference

Wet dam break configuration.

```
#include "initialization_hu.hpp"
```

Classes

- class Hu_generated_Wet_Dam_break

  Wet dam break configuration.

6.27.1 Detailed Description

Wet dam break configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of a dam break on a wet domain.

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6.28 Headers/libinitializations/hu_read.hpp File Reference

File configuration.

```
#include "initialization_hu.hpp"
```

Classes

- class Hu_read

  File configuration.

6.28.1 Detailed Description

File configuration.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-02-12

Initialization of the water height and of the velocity: the values are read in a file.

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6.29 Headers/libinitializations/initialization_hu.hpp File Reference

Initialization of h and u

```
#include "parameters.hpp"
```

Classes

- class Initialization_hu

  Initialization of h and u.

6.29.1 Detailed Description

Initialization of h and u

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the initialization of the water height and of the velocity.

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6.30 Headers/libinitializations/initialization_topo.hpp File Reference

Initialization of z

```
#include "parameters.hpp"
```

Classes

- class Initialization_topo

  Initialization of z.

6.30.1 Detailed Description

Initialization of z

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the initialization of the topography.

Copyright

6.31 Headers/libinitializations/topo_generated_bump.hpp File Reference

Bump configuration.

```
#include "initialization_topo.hpp"
```

Classes

- class Topo_generated_bump

  Bump configuration.

6.31.1 Detailed Description

Bump configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2011-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the topography: the topography is a bump.

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6.32 Headers/libinitializations/topo_generated_flat.hpp File Reference

Flat configuration.

```
#include "initialization_topo.hpp"
```

Classes

- class Topo_generated_flat

  Flat configuration.

6.32.1 Detailed Description

Flat configuration.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the topography: the topography is flat, its value is 0.

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6.33 Headers/libinitializations/topo_generated_thacker.hpp File Reference

Thacker configuration.

```
#include "initialization_topo.hpp"
```

Classes

- class Topo_generated_Thacker

  Thacker configuration.

6.33.1 Detailed Description

Thacker configuration.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the topography: parabolic topography for Thacker's Benchmark.

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6.34 Headers/libinitializations/topo_read.hpp File Reference

File configuration.

```
#include "initialization_topo.hpp"
```

Classes

- class Topo_read

  File configuration.

6.34.1 Detailed Description

File configuration.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the topography: the values are read in a file.

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6.35 Headers/liblimitations/choice_limiter.hpp File Reference

Choice of slope limiter.

```
   #include "limiter.hpp"
#include "minmod.hpp"
#include "vanalbada.hpp"
#include "vanleer.hpp"
```

Classes

- class Choice_limiter

  Choice of slope limiter.

Macros

- #define CHOICE_LIMITER_HPP

6.35.1 Detailed Description

Choice of slope limiter.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen slope limiter.

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6.35.2 Macro Definition Documentation

#define CHOICE_LIMITER_HPP

Definition at line 75 of file choice_limiter.hpp.

6.36 Headers/liblimitations/limiter.hpp File Reference

Slope limiter.

```
#include "parameters.hpp"
```

Classes

- class Limiter

  Slope limiter.

6.36.1 Detailed Description

Slope limiter.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the slope limiters.

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6.37 Headers/liblimitations/minmod.hpp File Reference

Minmod limiter

```
#include "limiter.hpp"
```

Classes

- class Minmod

  Minmod slope limiter

6.37.1 Detailed Description

Minmod limiter

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Slope limiter: minmod.

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6.38 Headers/liblimitations/vanalbada.hpp File Reference

Van Albada limiter.

```
#include "limiter.hpp"
```

Classes

- class VanAlbada
  Van Albada slope limiter.

6.38.1 Detailed Description

Van Albada limiter.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Slope limiter: Van Albada.

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6.39 Headers/liblimitations/vanleer.hpp File Reference

Van Leer limiter.

```
#include "limiter.hpp"
```

Classes

- class VanLeer

  Van Leer slope limiter.

6.39.1 Detailed Description

Van Leer limiter.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Slope limiter: Van Leer.

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6.40 Headers/libparameters/misc.hpp File Reference

Definitions.

```
#include <iostream>
#include <cstdlib>
#include <string>
#include <fstream>
#include <cmath>
#include <cstring>
#include <cstdio>
#include <iomanip>
#include <vector>
#include <unistd.h>
#include <ctime>
#include <sstream>
#include <cfloat>
```

Macros

- #define MAX(a, b) (a>=b?a:b)
- #define MIN(a, b) (a<=b?a:b)
- #define GRAV 9.81
- #define GRAV_DEM 4.905
- #define NB_CHAR 256
- #define ZERO 0.
- #define HE_CA 1.e-12
- #define VE_CA 1.e-12
- #define IE_CA 1.e-8
- #define EPSILON 1.e-13
- #define RATIO_CLOSE_CELL 1.e-3
- #define VERSION "FullSWOF_1D version 1.02.02, 2016-02-01"
- #define MAX_SCAL DBL_MAX

Typedefs

- typedef double SCALAR
- typedef vector< SCALAR > VECT

6.40.1 Detailed Description

Definitions.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.02

Date

2016-02-01

Defines the constants, the types used in the code and contains the 'include'.

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6.40.2 Macro Definition Documentation

#define EPSILON 1.e-13

Definition at line 81 of file misc.hpp.

#define GRAV 9.81

Definition at line 73 of file misc.hpp.

#define GRAV_DEM 4.905

Definition at line 74 of file misc.hpp.

#define HE_CA 1.e-12

Definition at line 78 of file misc.hpp.

#define IE_CA 1.e-8

Definition at line 80 of file misc.hpp.

#define MAX(*a, b*) (a>=b?a:b)

Definition at line 70 of file misc.hpp.

#define MAX_SCAL DBL_MAX

Definition at line 92 of file misc.hpp.

#define MIN(*a, b*) (a<=b?a:b)

Definition at line 71 of file misc.hpp.

#define NB_CHAR 256

Definition at line 76 of file misc.hpp.

#define RATIO_CLOSE_CELL 1.e-3

Definition at line 83 of file misc.hpp.

#define VE_CA 1.e-12

Definition at line 79 of file misc.hpp.

#define VERSION "FullSWOF_1D version 1.02.02, 2016-02-01"

Definition at line 85 of file misc.hpp.

#define ZERO 0.

Definition at line 77 of file misc.hpp.

6.40.3 Typedef Documentation

typedef double SCALAR

Definition at line 89 of file misc.hpp.

typedef vector<SCALAR> VECT

Definition at line 94 of file misc.hpp.

6.41 Headers/libparameters/parameters.hpp File Reference

Gets parameters.

```
   #include "misc.hpp"
#include "parser.hpp"
```

Classes

- class Parameters

  Gets parameters.

6.41.1 Detailed Description

Gets parameters.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2011-2015)

Version

1.02.01

Date

2015-03-12

Reads the parameters, checks their values.

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6.42 Headers/libparser/parser.hpp File Reference

Parser

```
   #include "misc.hpp"
```

Classes

- class Parser

  Parser to read the entries

6.42.1 Detailed Description

Parser

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Reads the input file.

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6.43 Headers/librain_infiltration/choice_infiltration.hpp File Reference

Choice of infiltration law.

```
   #include "infiltration.hpp"
#include "greenampt.hpp"
#include "no_infiltration.hpp"
```

Classes

- class Choice_infiltration

  Choice of infiltration law.

Macros

- #define CHOICE_INFILTRATION_HPP

6.43.1 Detailed Description

Choice of infiltration law.
author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen infiltration law.

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6.43.2 Macro Definition Documentation

#define CHOICE_INFILTRATION_HPP

Definition at line 70 of file choice_infiltration.hpp.

6.44 Headers/librain_infiltration/choice_rain.hpp File Reference

Choice of initialization for the rain.

```
   #include "rain.hpp"
#include "rain_read.hpp"
#include "rain_generated.hpp"
#include "no_rain.hpp"
```

Classes

- class Choice_rain

  Choice of initialization for the rain.

Macros

- #define CHOICE_RAIN_HPP

6.44.1 Detailed Description

Choice of initialization for the rain.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen initialization of the rain.

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6.44.2 Macro Definition Documentation

#define CHOICE_RAIN_HPP

Definition at line 73 of file choice_rain.hpp.

6.45 Headers/librain_infiltration/greenampt.hpp File Reference

Green-Ampt law.

```
   #include "infiltration.hpp"
```

Classes

- class GreenAmpt

  Green-Ampt law.

6.45.1 Detailed Description

Green-Ampt law.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Infiltration law: bi-layer Green-Ampt.

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6.46 Headers/librain_infiltration/infiltration.hpp File Reference

Infiltration

```
#include "parameters.hpp"
```

Classes

- class Infiltration

  Definition of infiltration law.

6.46.1 Detailed Description

Infiltration

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Common part for the infiltration.

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6.47 Headers/librain_infiltration/no_infiltration.hpp File Reference

No infiltration.

```
#include "infiltration.hpp"
```

Classes

- class No_Infiltration

  No infiltration.

6.47.1 Detailed Description

No infiltration.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Infiltration: there is no infiltration.

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6.48 Headers/librain_infiltration/no_rain.hpp File Reference

No rain.

```
#include "rain.hpp"
```

Classes

- class No_Rain

  No rain.

6.48.1 Detailed Description

No rain.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Rain: there is no rain.

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6.49 Headers/librain_infiltration/rain.hpp File Reference

Rain

```
#include "parameters.hpp"
```

Classes

- class Rain

  Initialization of the rain.

6.49.1 Detailed Description

Rain

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Common part for the initialization of the rain.

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6.50 Headers/librain_infiltration/rain_generated.hpp File Reference

Constant rain configuration.

```
#include "rain.hpp"
```

Classes

- class Rain_generated

  Constant rain configuration.

6.50.1 Detailed Description

Constant rain configuration.
author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the rain: the value is equals to 0.00001 m/s = 36 mm/h, constant during the simulation.

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6.51 Headers/librain_infiltration/rain_read.hpp File Reference

File configuration.

```
#include "rain.hpp"
```

Classes

- class Rain_read

  File configuration.

6.51.1 Detailed Description

File configuration.
author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the rain: the values are read in a file.

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6.52 Headers/libreconstructions/choice_reconstruction.hpp File Reference

Choice of reconstruction.

```
#include "reconstruction.hpp"
#include "muscl.hpp"
#include "eno.hpp"
#include "eno_mod.hpp"
```

Classes

- class Choice_reconstruction

  Choice of reconstruction.

Macros

- #define CHOICE_RECONSTRUCTION_HPP

6.52.1 Detailed Description

Choice of reconstruction.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen reconstruction.

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6.52.2 Macro Definition Documentation

#define CHOICE_RECONSTRUCTION_HPP

Definition at line 74 of file choice_reconstruction.hpp.

6.53 Headers/libreconstructions/eno.hpp File Reference

ENO reconstruction

```
#include "reconstruction.hpp"
```

Classes

- class ENO

  ENO recontruction

6.53.1 Detailed Description

ENO reconstruction

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Linear reconstruction: ENO.

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6.54 Headers/libreconstructions/eno_mod.hpp File Reference

Modified ENO reconstruction.

```
#include "reconstruction.hpp"
```

Classes

- class ENO_mod

  Modified ENO recontruction.

6.54.1 Detailed Description

Modified ENO reconstruction.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Linear reconstruction: modified ENO.

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6.55 Headers/libreconstructions/hydrostatic.hpp File Reference

Hydrostatic reconstruction

```
#include "parameters.hpp"
```

Classes

- class Hydrostatic

  Hydrostatic reconstruction

6.55.1 Detailed Description

Hydrostatic reconstruction

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

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6.56 Headers/libreconstructions/muscl.hpp File Reference

MUSCL reconstruction

```
#include "reconstruction.hpp"
```

Classes

- class MUSCL

  MUSCL recontruction

6.56.1 Detailed Description

MUSCL reconstruction

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Linear reconstruction: MUSCL.

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6.57 Headers/libreconstructions/reconstruction.hpp File Reference

Reconstruction

```
   #include "parameters.hpp"
#include "choice_limiter.hpp"
```

Classes

- class Reconstruction

  Reconstruction of the variables

6.57.1 Detailed Description

Reconstruction

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the reconstructions.

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6.58 Headers/libsave/choice_output.hpp File Reference

Choice of output format.

```
   #include "output.hpp"
#include "gnuplot.hpp"
```

Classes

- class Choice_output

  Choice of output format.

Macros

- #define CHOICE_OUTPUT_HPP

6.58.1 Detailed Description

Choice of output format.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the savings in the chosen format.

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6.58.2 Macro Definition Documentation

#define CHOICE_OUTPUT_HPP

Definition at line 65 of file choice_output.hpp.

6.59 Headers/libsave/gnuplot.hpp File Reference

Gnuplot output

```
   #include "output.hpp"
```

Classes

- class Gnuplot

  Gnuplot output

6.59.1 Detailed Description

Gnuplot output

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Output format: optimized for Gnuplot.

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6.60 Headers/libsave/output.hpp File Reference

Output format

```
#include "parameters.hpp"
```

Classes

- class Output

  Output format

6.60.1 Detailed Description

Output format

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the output formats.

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6.61 Headers/libschemes/choice_scheme.hpp File Reference

Choice of numerical scheme.

```
   #include "scheme.hpp"
#include "order1.hpp"
#include "order2.hpp"
```

Classes

- class Choice_scheme

  Choice of numerical scheme.

Macros

- #define CHOICE_SCHEME_HPP

6.61.1 Detailed Description

Choice of numerical scheme.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen numerical scheme.

Copyright

6.61.2 Macro Definition Documentation

#define CHOICE_SCHEME_HPP

Definition at line 70 of file choice_scheme.hpp.

6.62 Headers/libschemes/order1.hpp File Reference

Order 1 scheme.

```
   #include "scheme.hpp"
```

Classes

- class Order1

  Order 1 scheme.

6.62.1 Detailed Description

Order 1 scheme.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical scheme: at order 1.

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6.63 Headers/libschemes/order2.hpp File Reference

Order 2 scheme.

```
#include "scheme.hpp"
```

Classes

- class Order2

  Order 2 scheme.

6.63.1 Detailed Description

Order 2 scheme.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical scheme: at order 2.

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6.64 Headers/libschemes/scheme.hpp File Reference

Numerical scheme.

```
   #include "hydrostatic.hpp"
#include "choice_condition.hpp"
#include "choice_flux.hpp"
#include "choice_friction.hpp"
#include "choice_init_topo.hpp"
#include "choice_init_hu.hpp"
#include "choice_rain.hpp"
#include "choice_infiltration.hpp"
#include "choice_output.hpp"
#include "choice_reconstruction.hpp"
```

Classes

- class Scheme

  Numerical scheme.

6.64.1 Detailed Description

Numerical scheme.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the numerical schemes.

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6.65 Sources/FullSWOF_1D.cpp File Reference

Main function.

```
#include "choice_scheme.hpp"
```

Functions

- int main ()

6.65.1 Detailed Description

Main function.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Runs the programm.

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6.65.2 Function Documentation

int main ( )

Main function
Declare the scheme and executes the program.

Returns

0 if the program finished correctly.

Note

The name of the input file (Inputs/parameters.txt) is written here.

Definition at line 57 of file FullSWOF_1D.cpp.

6.66 Sources/libboundaryconditions/bc_imp_discharge.cpp File Reference

Imposed discharge.

```
#include "bc_imp_discharge.hpp"
```

6.66.1 Detailed Description

Imposed discharge.

Author

Ulrich Razafison ulrich.razafison@math.cnrs.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2011-2015)

Version

1.02.02

Date

2015-10-29

Boundary condition: imposed discharge (and water height if necessary).

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6.67 Sources/libboundaryconditions/bc_imp_height.cpp File Reference

Imposed water height.

```
#include "bc_imp_height.hpp"
```

6.67.1 Detailed Description

Imposed water height.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Boundary condition: imposed water height (and discharge if necessary), based on the modified method of characteristics and Riemann invariants.

See also

Olivier Delestre Ph.D thesis Annexe A Delestre [2010] http://tel.archives-ouvertes.↩
fr/tel-00587197

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6.68 Sources/libboundaryconditions/bc_neumann.cpp File Reference

Neumann condition.

```
#include "bc_neumann.hpp"
```

6.68.1 Detailed Description

Neumann condition.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Boundary condition: Neumann condition (the normal derivative is null).

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6.69 Sources/libboundaryconditions/bc_periodic.cpp File Reference

Periodic condition.

```
#include "bc_periodic.hpp"
```

6.69.1 Detailed Description

Periodic condition.

Author

Pierre-Antoine Ksinant pierreantoine.ksinantgarcia@gmail.com (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Boundary condition: periodic condition.

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6.70 Sources/libboundaryconditions/bc_wall.cpp File Reference

Wall condition.

```
#include "bc_wall.hpp"
```

6.70.1 Detailed Description

Wall condition.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Boundary condition: wall condition (the discharge at the boundary is null).

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6.71 Sources/libboundaryconditions/boundary_condition.cpp File Reference

Boundary condition.

```
#include "boundary_condition.hpp"
```

6.71.1 Detailed Description

Boundary condition.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the boundary conditions.

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6.72 Sources/libboundaryconditions/choice_condition.cpp File Reference

Choice of boundary condition.

```
#include "choice_condition.hpp"
```

6.72.1 Detailed Description

Choice of boundary condition.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen boundary condition.

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6.73 Sources/libflux/choice_flux.cpp File Reference

Choice of numerical flux.

```
#include "choice_flux.hpp"
```

6.73.1 Detailed Description

Choice of numerical flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen numerical flux.

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6.74 Sources/libflux/f_hll.cpp File Reference

HLL flux.

```
#include "f_hll.hpp"
```

6.74.1 Detailed Description

HLL flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.02

Date

2015-06-16

Numerical flux: Harten, Lax, van Leer formulation.

Copyright

6.75 Sources/libflux/f_hll2.cpp File Reference

HLL flux.

```
#include "f_hll2.hpp"
```

6.75.1 Detailed Description

HLL flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.02

Date

2015-06-16

Numerical flux: Harten, Lax, van Leer reduced formulation.

Copyright

6.76 Sources/libflux/f_kinetic.cpp File Reference

Kinetic flux.

```
#include "f_kinetic.hpp"
```

6.76.1 Detailed Description

Kinetic flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical flux: kinetic formulation.

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6.77 Sources/libflux/f_rusanov.cpp File Reference

Rusanov flux.

```
#include "f_rusanov.hpp"
```

6.77.1 Detailed Description

Rusanov flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical flux: Rusanov formulation.

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6.78 Sources/libflux/f_vfroe.cpp File Reference

VFRoe flux.

```
#include "f_vfroe.hpp"
```

6.78.1 Detailed Description

VFRoe flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical flux: VFRoe-ncv formulation.

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6.79 Sources/libflux/flux.cpp File Reference

Numerical flux.

```
#include "flux.hpp"
```

6.79.1 Detailed Description

Numerical flux.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the numerical fluxes.

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6.80 Sources/libfrictions/choice_friction.cpp File Reference

Choice of friction law.

```
#include "choice_friction.hpp"
```

6.80.1 Detailed Description

Choice of friction law.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen friction law.

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6.81 Sources/libfrictions/fr_darcy_weisbach.cpp File Reference

Darcy-Weisbach law.

```
#include "fr_darcy_weisbach.hpp"
```

6.81.1 Detailed Description

Darcy-Weisbach law.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Friction law: Darcy-Weisbach.

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6.82 Sources/libfrictions/fr_laminar.cpp File Reference

Laminar law.

```
#include "fr_laminar.hpp"
```

6.82.1 Detailed Description

Laminar law.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2014-2015)

Version

1.02.01

Date

2015-03-12

Friction law: laminar.

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6.83 Sources/libfrictions/fr_manning.cpp File Reference

Manning law.

```
#include "fr_manning.hpp"
```

6.83.1 Detailed Description

Manning law.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Friction law: Manning.

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6.84 Sources/libfrictions/friction.cpp File Reference

Friction law

```
#include "friction.hpp"
```

6.84.1 Detailed Description

Friction law

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the friction laws.

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6.85 Sources/libfrictions/no_friction.cpp File Reference

No friction.

```
#include "no_friction.hpp"
```

6.85.1 Detailed Description

No friction.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Friction law: does no computation.

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6.86 Sources/libinitializations/choice_init_hu.cpp File Reference

Choice of initialization for h and u.

```
#include "choice_init_hu.hpp"
```

6.86.1 Detailed Description

Choice of initialization for h and u.

Author

Christian Laguerre christian.laguerre@math.cnrs.fr (2009)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen initialization of the water height and of the velocity.

6.87 Sources/libinitializations/choice_init_topo.cpp File Reference

Choice of initialization for the topography.

```
#include "choice_init_topo.hpp"
```

6.87.1 Detailed Description

Choice of initialization for the topography.

Author

Christian Laguerre christian.laguerre@math.cnrs.fr (2009)
Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen initialization of the topography.

6.88 Sources/libinitializations/hu_generated.cpp File Reference

No water configuration.

```
#include "hu_generated.hpp"
```

6.88.1 Detailed Description

No water configuration.

Author

Christian Laguerre christian.laguerre@math.cnrs.fr (2009)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of a dry domain.

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6.89 Sources/libinitializations/hu_generated_dressler_dam_break.cpp File Reference

Dressler dam break configuration.

```
#include "hu_generated_dressler_dam_break.hpp"
```

6.89.1 Detailed Description

Dressler dam break configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of a dam break as studied by Dressler (with friction).

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6.90 Sources/libinitializations/hu_generated_dry_dam_break.cpp File Reference

Dry dam break configuration.

```
#include "hu_generated_dry_dam_break.hpp"
```

6.90.1 Detailed Description

Dry dam break configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of a dam break on a dry domain.

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6.91 Sources/libinitializations/hu_generated_thacker.cpp File Reference

Thacker configuration.

```
#include "hu_generated_thacker.hpp"
```

6.91.1 Detailed Description

Thacker configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of Thacker's benchmark.

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6.92 Sources/libinitializations/hu_generated_wet_dam_break.cpp File Reference

Wet dam break configuration.

```
#include "hu_generated_wet_dam_break.hpp"
```

6.92.1 Detailed Description

Wet dam break configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: case of a dam break on a wet domain.

6.93 Sources/libinitializations/hu_read.cpp File Reference

File configuration.

```
#include "hu_read.hpp"
```

6.93.1 Detailed Description

File configuration.

Author

Christian Laguerre christian.laguerre@math.cnrs.fr (2009)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the water height and of the velocity: the values are read in a file.

6.94 Sources/libinitializations/initialization_hu.cpp File Reference

Initialization of h and u

```
#include "initialization_hu.hpp"
```

6.94.1 Detailed Description

Initialization of h and u

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the initialization of the water height and of the velocity.

Copyright

6.95 Sources/libinitializations/initialization_topo.cpp File Reference

Initialization of z

```
#include "initialization_topo.hpp"
```

6.95.1 Detailed Description

Initialization of z

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the initialization of the topography.

Copyright

6.96 Sources/libinitializations/topo_generated_bump.cpp File Reference

Bump configuration.

```
#include "topo_generated_bump.hpp"
```

6.96.1 Detailed Description

Bump configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the topography: the topography is a bump.

6.97 Sources/libinitializations/topo_generated_flat.cpp File Reference

Flat configuration.

```
#include "topo_generated_flat.hpp"
```

6.97.1 Detailed Description

Flat configuration.

Author

Christian Laguerre christian.laguerre@math.cnrs.fr (2009)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the topography: the topography is flat, its value is 0.

6.98 Sources/libinitializations/topo_generated_thacker.cpp File Reference

Thacker configuration.

```
#include "topo_generated_thacker.hpp"
```

6.98.1 Detailed Description

Thacker configuration.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the topography: parabolic topography for Thacker's Benchmark.

6.99 Sources/libinitializations/topo_read.cpp File Reference

File configuration.

```
#include "topo_read.hpp"
```

6.99.1 Detailed Description

File configuration.

Author

Christian Laguerre christian.laguerre@math.cnrs.fr (2009)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the topography: the values are read in a file.

6.100 Sources/liblimitations/choice_limiter.cpp File Reference

Choice of slope limiter.

```
#include "choice_limiter.hpp"
```

6.100.1 Detailed Description

Choice of slope limiter.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2010)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen slope limiter.

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6.101 Sources/liblimitations/limiter.cpp File Reference

Slope limiter.

```
#include "limiter.hpp"
```

6.101.1 Detailed Description

Slope limiter.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the slope limiters.

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6.102 Sources/liblimitations/minmod.cpp File Reference

Minmod limiter

```
#include "minmod.hpp"
```

6.102.1 Detailed Description

Minmod limiter

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Slope limiter: minmod.

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6.103 Sources/liblimitations/vanalbada.cpp File Reference

Van Albada limiter.

```
#include "vanalbada.hpp"
```

6.103.1 Detailed Description

Van Albada limiter.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Slope limiter: Van Albada.

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6.104 Sources/liblimitations/vanleer.cpp File Reference

Van Leer limiter.

```
#include "vanleer.hpp"
```

6.104.1 Detailed Description

Van Leer limiter.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Slope limiter: Van Leer.

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6.105 Sources/libparameters/parameters.cpp File Reference

Gets parameters.

```
#include "parameters.hpp"
```

6.105.1 Detailed Description

Gets parameters.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2011-2015)
Frederic Darboux frederic.darboux@orleans.inra.fr (2014)

Version

1.02.01

Date

2015-03-12

Reads the parameters, checks their values.

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6.106 Sources/libparser/parser.cpp File Reference

Parser

```
#include "parser.hpp"
```

6.106.1 Detailed Description

Parser

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Reads the input file.

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6.107 Sources/librain_infiltration/choice_infiltration.cpp File Reference

Choice of infiltration law.

```
#include "choice_infiltration.hpp"
```

6.107.1 Detailed Description

Choice of infiltration law.
author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen infiltration law.

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6.108 Sources/librain_infiltration/choice_rain.cpp File Reference

Choice of initialization for the rain.

```
#include "choice_rain.hpp"
```

6.108.1 Detailed Description

Choice of initialization for the rain.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen initialization of the rain.

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6.109 Sources/librain_infiltration/greenampt.cpp File Reference

Green-Ampt law.

```
#include "greenampt.hpp"
```

6.109.1 Detailed Description

Green-Ampt law.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.02

Date

2015-06-16

Infiltration law: bi-layer Green-Ampt.

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6.110 Sources/librain_infiltration/infiltration.cpp File Reference

Infiltration

```
#include "infiltration.hpp"
```

6.110.1 Detailed Description

Infiltration

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Common part for the infiltration.

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6.111 Sources/librain_infiltration/no_infiltration.cpp File Reference

No infiltration.

```
#include "no_infiltration.hpp"
```

6.111.1 Detailed Description

No infiltration.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Infiltration: there is no infiltration.

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6.112 Sources/librain_infiltration/no_rain.cpp File Reference

No rain.

```
#include "no_rain.hpp"
```

6.112.1 Detailed Description

No rain.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Rain: there is no rain.

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6.113 Sources/librain_infiltration/rain.cpp File Reference

Rain

```
#include "rain.hpp"
```

6.113.1 Detailed Description

Rain

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Common part for the initialization of the rain.

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6.114 Sources/librain_infiltration/rain_generated.cpp File Reference

Constant rain configuration.

```
#include "rain_generated.hpp"
```

6.114.1 Detailed Description

Constant rain configuration.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the rain: the value is equals to 0.00001 m/s = 36 mm/h, constant during the simulation.

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6.115 Sources/librain_infiltration/rain_read.cpp File Reference

File configuration.

```
#include "rain_read.hpp"
```

6.115.1 Detailed Description

File configuration.

author Carine Lucas carine.lucas@univ-orleans.fr (2013-2015)

Version

1.02.01

Date

2015-03-12

Initialization of the rain: the values are read in a file.

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6.116 Sources/libreconstructions/choice_reconstruction.cpp File Reference

Choice of reconstruction.

```
#include "choice_reconstruction.hpp"
```

6.116.1 Detailed Description

Choice of reconstruction.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen reconstruction.

6.117 Sources/libreconstructions/eno.cpp File Reference

ENO reconstruction

```
#include "eno.hpp"
```

6.117.1 Detailed Description

ENO reconstruction

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Linear reconstruction: ENO.

6.118 Sources/libreconstructions/eno_mod.cpp File Reference

Modified ENO reconstruction.

```
#include "eno_mod.hpp"
```

6.118.1 Detailed Description

Modified ENO reconstruction.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Linear reconstruction: modified ENO.

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6.119 Sources/libreconstructions/hydrostatic.cpp File Reference

Hydrostatic reconstruction

```
#include "hydrostatic.hpp"
```

6.119.1 Detailed Description

Hydrostatic reconstruction

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

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6.120 Sources/libreconstructions/muscl.cpp File Reference

MUSCL reconstruction

```
#include "muscl.hpp"
```

6.120.1 Detailed Description

MUSCL reconstruction

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Linear reconstruction: MUSCL.

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6.121 Sources/libreconstructions/reconstruction.cpp File Reference

Reconstruction

```
#include "reconstruction.hpp"
```

6.121.1 Detailed Description

Reconstruction

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the reconstructions.

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6.122 Sources/libsave/choice_output.cpp File Reference

Choice of output format.

```
#include "choice_output.hpp"
```

6.122.1 Detailed Description

Choice of output format.

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the savings in the chosen format.

6.123 Sources/libsave/gnuplot.cpp File Reference

Gnuplot output

```
#include "gnuplot.hpp"
```

6.123.1 Detailed Description

Gnuplot output

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Output format: optimized for Gnuplot (for huz_evolution.dat).

6.124 Sources/libsave/output.cpp File Reference

Output format

```
#include "output.hpp"
```

6.124.1 Detailed Description

Output format

Author

Carine Lucas carine.lucas@univ-orleans.fr (2010-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the output formats.

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6.125 Sources/libschemes/choice_scheme.cpp File Reference

Choice of numerical scheme.

```
#include "choice_scheme.hpp"
```

6.125.1 Detailed Description

Choice of numerical scheme.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

From the value of the corresponding parameter, calls the chosen numerical scheme.

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6.126 Sources/libschemes/order1.cpp File Reference

Order 1 scheme.

```
#include "order1.hpp"
```

6.126.1 Detailed Description

Order 1 scheme.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical scheme: at order 1.

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6.127 Sources/libschemes/order2.cpp File Reference

Order 2 scheme.

```
#include "order2.hpp"
```

6.127.1 Detailed Description

Order 2 scheme.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Numerical scheme: at order 2.

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6.128 Sources/libschemes/scheme.cpp File Reference

Numerical scheme.

```
#include "scheme.hpp"
```

6.128.1 Detailed Description

Numerical scheme.

Author

Olivier Delestre olivierdelestre41@yahoo.fr (2008)
Carine Lucas carine.lucas@univ-orleans.fr (2012-2015)

Version

1.02.01

Date

2015-03-12

Common part for all the numerical schemes.

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