Introduction

Module FillMatrix has two main purposes:

- Initialise 2D and 3D fields in space through a different number of methods;
- Modify those fields in time by reading the solution from a file.

The module is prepared to perform these operations for both 2D and 3D domains, allowing coupling it straightforwardly to the other modules.

Modification methods

None

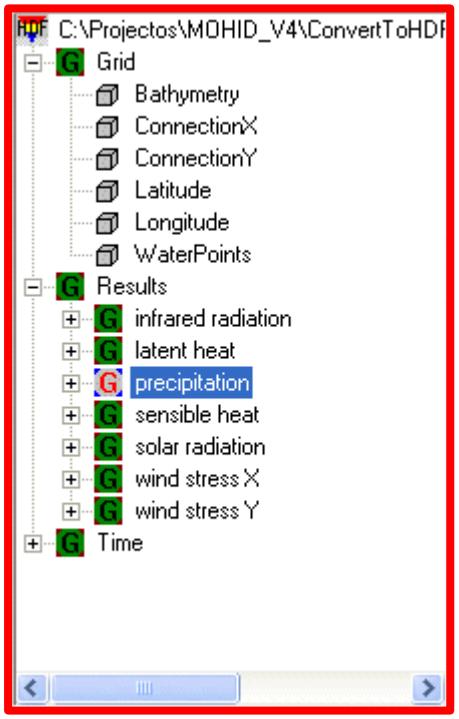
If modification method is defined as none, then the field is only initialised, and solution in time is provided by other means than reading it from a file.
In order to define that the field is not to be modified in time, i.e. NONE modification method, the following keyword lines are accepted:

Keyword	Description	Possible options	Example
FILE_IN_TIME	Defines the kind of reading operation performed in time to modify the field	NONE, none, None	NONE

HDF

If modification method is defined as HDF[1], then the field is to be initialised and modified from a pre-processed HDF5 format file. This file is required to follow some rules:

[1] [1] Hierarchical Data Format, developed at the National Center for Supercomputing Applications, http://www.ncsa.uiuc.edu



- The fields stored in the file must correspond to the modelled domain, that is, they must correspond to the same horizontal and vertical grid.
- In the Grid folder it is required to have the data sets shown in Figure 1.
- The name of the fields must be recognised by Mohid (see list of supported names)
- Time data set must contain as many instants as the field data sets
- Time data set must also contain dates for a period of the same or greater duration of the simulation.

Figure 1 - Example of a supported HDF file (tree viewed in Mohid PostProcessor)

In order to define HDF as the modification method, the following keyword lines are accepted:

Keyword	Description	Possible options	Example
FILE_IN_TIME	Defines the kind of reading operation performed in time to modify the field	HDF, hdf, Hdf	NONE
FILENAME	Path to the HDF5 format file	-	..\data\file.hdf5

These files can be either generated from previous simulations using Mohid or from importing other files in different formats using the Mohid ConvertToHDF5 tool.

Time series

If modification method is defined as a time series, then the field is to be initialised and modified from a pre-processed Mohid time series format file. The time series format assumes a constant value in space but variable in time.

Keyword	Description	Possible options	Example
FILE_IN_TIME	Defines the kind of reading operation performed in time to modify the field	TIMESERIE, TimeSerie, Timeserie, timeserie	NONE
FILENAME	Path to the time series file	-	..\data\timeseries.dat
DATA_COLUMN	Number of the column to be read in the time series file	-	2

Initialization methods

If the field modification method is NONE, then the FillMatrix instance associated to the field will only serve to initialise it. There are five initialisation methods shown below with a brief description of how they can be used.

Constant

Keyword	Description	Possible options	Example
INITIALIZATION_METHOD	States that the default value is to me assumed in all domain	CONSTANT, Constant, constant	CONSTANT
DEFAULTVALUE	Default value to be assumed	-	18.3
REMAIN_CONSTANT	States if field remains constant in time	- 0 (false) - 1 (true)	1

Layers

Keyword	Description	Possible options	Example
INITIALIZATION_METHOD	States that the field is to be initialised with a constant value in each layer	LAYERS, Layers, layers	LAYERS
DEFAULTVALUE	Default value to be assumed	-	18.3
LAYERS_VALUES	Sequence of values for each layer starting from the bottom layer	-	15.0 15.3 16.2 16.4 17.2
REMAIN_CONSTANT	States if field remains constant in time	- 0 (false) - 1 (true)	1

Boxes

Keyword	Description	Possible options	Example
INITIALIZATION_METHOD	States that the field is to be initialised with a constant value in each box, defined by a boxes file	BOXES, Boxes, boxes	BOXES
DEFAULTVALUE	Default value to be assumed in the parts of the domain not included in boxes definition	-	18.3
FILENAME	Path to the boxes definition file	-	..\data\boxes.dat
BOXES_VALUES	Sequence of values for each box starting from box 1	-	15.0 15.3 16.2 16.4 17.2
REMAIN_CONSTANT	States if field remains constant in time	- 0 (false) - 1 (true)	1

ASCII file

Keyword	Description	Possible options	Example
INITIALIZATION_METHOD	States that the field is to be initialised from an ASCII file, formatted as a Mohid GridData2D or GridData3D	ASCII_File, ASCII_FILE, ascii_file, Ascii_file	ASCII_FILE
DEFAULTVALUE	Default value to be assumed	-	18.3
FILENAME	Path to the ASCII file	-	..\data\file.dat
REMAIN_CONSTANT	States if field remains constant in time	- 0 (false) - 1 (true)	1

Profile

Keyword	Description	Possible options	Example
INITIALIZATION_METHOD	States that the field is to be initialised from a profile in depth which will be interpolated to the vertical grid	PROFILE, Profile, profile	PROFILE
DEFAULTVALUE	Default value to be assumed	-	18.3
NDEPTHS	Number of values that the define the profile	-	5
DEPTH_PROFILE	Sequence of depth values	-	250. 200. 150. 100. 50.
PROFILE_VALUES	Sequence of values that constitute the profile	-	15.0 15.3 16.2 16.4 17.2
REMAIN_CONSTANT	States if field remains constant in time	- 0 (false) - 1 (true)	1

Defaults

Keyword	Default value	Possible options	Description
FILE_IN_TIME	NONE	- NONE, none, None - Hdf, HDF, hdf - Timeserie, TIMESERIE, timeserie, TimeSerie	Defines what kind of reading operation is performed in time to modify field's value
INITIALIZATION_METHOD	Constant	- Constant, CONSTANT, constant - Layers, LAYERS, layers - Boxes, BOXES, boxes - ASCII_File, ASCII_FILE, ascii_file, Ascii_file - Profile, PROFILE, profile	Supported initialisation methods
REMAIN_CONSTANT	FALSE	-	States if field remains constant in time
DEFAULTVALUE	-9.9e15	Must be defined always	Default value to attribute to the field