Example DIP documentation

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Introduction

In this document we want to demonstrate basic capabilities of a DIP documentation.

The documentation is structured into 3 main sections. The first section summarizes all parameters in a DIP code, as well as their corresponding node definitions, declarations, modifications and corresponding properties. Following section summarizes all references of injected values and lists imported nodes. The final section gives an overview of custom units and code sources.

Parameters, nodes, sections and many other items in this documentation are cross-linked between each other. All hyperlinks are denoted with a blue text.

Parameters

Node types

Parameter list

Property name	#	#	#	#	#	#	#
box.geometry		1				1	
box.size.vy		1					
box.size.x	1				1		1
box.size.y	1	1		1			1
box.size.z		1					
cells.densities		1					1
cells.sizes		1					1
cells.temperatures		1					1
cfl_factor		1					
max_vare		1					
max_vari		1					
modules.heating	1				1		1
modules.hydrodynamics		1					
modules.radiation	1				1		1
runtime.t_max	1				1		1
runtime.timestep	1				1		1
simulation.directory	1					1	
simulation.name		1					
simulation.precision		1					

Parameter nodes

box.geometry

PDF_FILE1:20	injected	uint16
Value:	3	
Options:	1, 2, 3	
Description:	Type of grid geometry	

box.size.vy

PDF_FILE1:38	float64
Value:	23.000
Unit:	km/s

box.size.x

PDF_FILE1:27	float128
Unit:	cm
Condition:	{?} > 0
Description:	Box size in X direction
settings:8 | imported	mod
Value:	10
Unit:	nm

box.size.y

PDF_FILE1:32	float64
Unit:	cm
Options:	3.0 cm, 4.0 cm
Description:	Box size in Y direction
PDF_FILE1:37	float64
Value:	34.000
Unit:	au
settings:9 | imported	mod
Value:	3e7
Unit:	nm

box.size.z

PDF_FILE1:43	constant float64
Value:	23.000
Unit:	cm
Options:	10.0 m, 20.0 cm, 23.0 cm, 26.0 cm
Description:	Box size in Z direction

cells.densities

cells:1 | imported	float64
Value:	[0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0]
Unit:	km/s

cells.sizes

cells:2 | imported	int32
Value:	[10, 11, 12, 13, 14, 15, 16, 17, 18, 19]
Unit:	cm

cells.temperatures

cells:3 | imported	float64
Value:	[20.0, 21.0, 22.0, 23.0, 24.0, 25.0, 26.0, 27.0, 28.0, 29.0]
Unit:	K

cfl_factor

PDF_STRING1:4	float64
Value:	0.700

max_vare

PDF_STRING1:5	float64
Value:	0.200

max_vari

PDF_STRING1:6	float64
Value:	0.200

modules.heating

PDF_FILE1:57	bool
Tags:	preprocessor
Description:	Switch on heating module
settings:12 | imported	mod
Value:	false

modules.hydrodynamics

PDF_FILE1:54	bool
Value:	true
Tags:	preprocessor
Description:	Switch on hydrodynamics module

modules.radiation

PDF_FILE1:60	bool

Tags:	preprocessor
Description:	Switch on radiation module
settings:13 | imported	mod
Value:	true

runtime.t_max

PDF_FILE1:11	float64
Unit:	s
Condition:	{?} > 0
Description:	Maximum simulation time
settings:2 | imported	mod
Value:	10
Unit:	ns

runtime.timestep

PDF_FILE1:14	float64
Unit:	s
Condition:	{?} < {?runtime.t_max} && {?} > 0
Description:	Simulation time step
settings:3 | imported	mod
Value:	0.01
Unit:	ns

simulation.directory

PDF_FILE1:8 | injected	mod

simulation.name

PDF_FILE1:4	str
Value:	simulation
Format:	[a-zA-Z_-]+

simulation.precision

PDF_FILE1:6	str
Value:	double
Options:	double, float

References

Injected values

PDF_FILE1:8	
Injecting node:	simulation.directory
Request:	{pahts?simulation.directory}

PDF_FILE1:20	
Injecting node:	box.geometry
Request:	{settings?box.geometry}
From source:	settings:6
Value:	3

Imported nodes

PDF_FILE1:17	
Request:	{settings?runtime.*}
Imported node:	From source:
runtime.t_max	settings:2
runtime.timestep	settings:3

PDF_FILE1:49	
Request:	{settings?box.size.*}
Imported node:	From source:
box.size.x	settings:8
box.size.y	settings:9

PDF_FILE1:51	
Request:	{options?box.boundary.*}

PDF_FILE1:64	
Request:	{settings?modules.*}
Imported node:	From source:
modules.heating	settings:12
modules.radiation	settings:13

PDF_FILE1:67	
Request:	{cells?*}
Imported node:	From source:
cells.densities	cells:1
cells.sizes	cells:2
cells.temperatures	cells:3

Settings

List of units

Name	Value	Units	Source
[velocity]	13	cm/s	PDF_ROOT:25
[length]	1	cm	PDF_STRING1:1
[mass]	2	g	PDF_STRING1:2

List of sources

PDF_ROOT

File:	build_export_docs.py

PDF_STRING1

File:	build_export_docs.py
Source:	PDF_ROOT:26

```
1            $unit length = 1 cm
2            $unit mass = 2 g
3
4            cfl_factor float = 0.7   # Courant-Friedrichs-Lewy condition
5            max_vare float = 0.2     # maximum energy change of electrons
6            max_vari float = 0.2     # maximum energy change of ions
```

PDF_FILE1

File:	definitions.dip
Source:	PDF_ROOT:35

```
1    $source settings = settings.dip
2
3    simulation
4      name str = "simulation"
5        !format "[a-zA-Z_-]+"
6      precision str = "double"
7        !options ["double","float"]
8      directory = {pahts?simulation.directory}
9
10   runtime
11     t_max float s                # mandatory
12       !condition ("{?} > 0")
13       !description "Maximum simulation time"
14     timestep float s
15       !condition ("{?} < {?runtime.t_max} && {?} > 0")   # mandatory
16       !description "Simulation time step"
17     {settings?runtime.*}
18
19   box
20     geometry uint16 = {settings?box.geometry}   # mandatory
21       = 1   # linear
22       = 2   # cylindrical
23       = 3   # spherical
24       !description "Type of grid geometry"
25
26     size
27       x float128 cm               # mandatory
28         !condition ("{?} > 0")
29         !description "Box size in X direction"
30       #y float cm                 # first declared here
31       @case ("{?box.geometry} == 2")
32         y float cm                # mandatory if geometry is non-linear
33           = 3 cm
34           = 4 cm
35         !description "Box size in Y direction"
36       @case ("{?box.geometry} == 3")
37         y float = 34 au
38         vy float = 23 km/s
39       #@else
40       #  y float = 3 m
41       @end
42       @case ("{?box.geometry} == 3")
43         z float = 23 cm           # constant
44           = 10 m
45           !options [20,23,26] cm
46           !description "Box size in Z direction"
```

```
47          !constant
48       @end
49       {settings?box.size.*}
50     boundary
51       {options?box.boundary.*}
52
53   modules
54     hydrodynamics bool = true   # optional
55       !description "Switch on hydrodynamics module"
56       !tags ["preprocessor"]
57     heating bool                # mandatory
58       !description "Switch on heating module"
59       !tags ["preprocessor"]
60     radiation bool              # mandatory
61       !description "Switch on radiation module"
62       !tags ["preprocessor"]
63
64     {settings?modules.*}
65
66   cells
67     {cells?*}
```

cells

File:	cells.dip
Source:	PDF_ROOT:34

```
1    densities float[10]   = [0,1,2,3,4,5,6,7,8,9] km/s
2    sizes int[10]         = [10,11,12,13,14,15,16,17,18,19] cm
3    temperatures float[10] = [20,21,22,23,24,25,26,27,28,29] K
```

settings

File:	settings.dip
Source:	PDF_FILE1:1

```
1    runtime
2      t_max = 10 ns
3      timestep = 0.01 ns
4
5    box
6      geometry = 3
7      size
8        x = 10 nm
9        y = 3e7 nm
10
11   modules
12     heating = false
13     radiation = true
```