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

- Declaration
- Definition
- Declaration / Modification
- Definition / Modification
- Modification
- Injection
- Import

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:27
[length]	1	cm	PDF_STRING1:1
[mass]	2	g	PDF_STRING1:2

List of sources

PDF_ROOT	
File:	build_docs.py

PDF_STRING1	
File:	build_docs.py
Source:	PDF_ROOT:28

```
$unit length = 1 cm
$unit mass = 2 g

cfl_factor float = 0.7  # Courant-Friedrichs-Lewy condition
max_vare float = 0.2    # maximum energy change of electrons
max_vari float = 0.2    # maximum energy change of ions
```

PDF_FILE1	
File:	definitions.dip
Source:	PDF_ROOT:37

```
$source settings = settings.dip

simulation
  name str = "simulation"
    !format "[a-zA-Z_-]+"
  precision str = "double"
    !options ["double","float"]
  directory = {pahts?simulation.directory}

runtime
  t_max float s              # mandatory
    !condition ("{?} > 0")
    !description "Maximum simulation time"
  timestep float s
    !condition ("{?} < {?runtime.t_max} && {?} > 0")  # mandatory
    !description "Simulation time step"
  {settings?runtime.*}

box
  geometry uint16 = {settings?box.geometry}  # mandatory
    = 1  # linear
    = 2  # cylindrical
    = 3  # spherical
    !description "Type of grid geometry"

  size
    x float128 cm            # mandatory
      !condition ("{?} > 0")
      !description "Box size in X direction"
    #y float cm               # first declared here
    @case ("{?box.geometry} == 2")
      y float cm             # mandatory if geometry is non-linear
        = 3 cm
        = 4 cm
        !description "Box size in Y direction"
    @case ("{?box.geometry} == 3")
      y float = 34 au
      vy float = 23 km/s
    #@else
    #  y float = 3 m
    @end
    @case ("{?box.geometry} == 3")
      z float = 23 cm        # constant
        = 10 m
        !options [20,23,26] cm
        !description "Box size in Z direction"
```

```
          !constant
      @end
      {settings?box.size.*}
    boundary
      {options?box.boundary.*}

  modules
    hydrodynamics bool = true  # optional
      !description "Switch on hydrodynamics module"
      !tags ["preprocessor"]
    heating bool               # mandatory
      !description "Switch on heating module"
      !tags ["preprocessor"]
    radiation bool             # mandatory
      !description "Switch on radiation module"
      !tags ["preprocessor"]

    {settings?modules.*}

  cells
    {cells?*}
```

cells	
File:	cells.dip
Source:	PDF_ROOT:36

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

settings	
File:	settings.dip
Source:	PDF_FILE1:1

```
runtime
  t_max = 10 ns
  timestep = 0.01 ns

box
  geometry = 3
  size
    x = 10 nm
    y = 3e7 nm

modules
  heating = false
  radiation = true
```