

Subject : Manual, Two step FVE method
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1 Description of input file

Nine observation points are hard coded in the software, these are located at:

- 1 the centre of the grid.
- 2 in the middle of the north boundary.
- 3 in the middle of the east boundary.
- 4 in the middle of the south boundary.
- 5 in the middle of the west boundary.
- 6 in the North-East corner of the grid.
- 7 in the South-East corner of the grid.
- 8 in the South-West corner of the grid.
- 9 in the North-West corner of the grid.

Extra observation points can be specified in the input file according the description in [section 2](#)

2 File description

Items in the color red are only to be used in the development stage of the software. An example input file is given in [section 3](#).

Table 1: Standard input-file with default settings.

Keyword	Default	Description
logging	"None"	"iterations" "matrix" "pattern"
[Boundary]		
treg	150.0	Regularization time boundary signal
eps_bc_corr	0.01	Boundary correction term to force the boundary value to the given boundary value
bc_type	[, , ,]	["free-slip" "no-slip" "borsboom" "mooiman"]
bc_vars	[, , ,]	["-" "zeta" "q"]
bc_vals	[, , ,]	[Real value]
bc_absorbing	[, , ,]	[Boolean value]
[Domain]		
bed-level-file	-	Name of bed-level-file between double quotes
mesh-file	-	Name of mesh file point between double quotes

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Keyword	Default	Description
[Initial]		
ini_vars	None	["zeta", "zeta_gauss_hump" "zeta_constant" "zeta_gauss_hump_x" "zeta_gauss_hump_y"]
gauss_amp	0.0	
gauss_mu	0.0	
gauss_mu_x	0.0	
gauss_mu_y	0.0	
gauss_sigma	350.0	
gauss_sigma_x	350.0	Optional if "gauss_sigma" is not specified
gauss_sigma_y	350.0	Optional if "gauss_sigma" is not specified
[Numerics]		
dt	5.0	Time step size [s], if dt == 0: then stationary simulation
theta	0.501	Implicitness factor ($0.5 \leq \theta \leq 1.0$)
c_psi	4.0	Smoothness factor used for regularization
iter_max	25	Maximum number of nonlinear iterations
eps_newton	1e-12	Accuracy of the Newton solver (non-linear)
eps_bicgstab	1e-06	Accuracy of the linear solver
eps_abs_function	0.01	Smoothing factor for the absolute-function
linear_solver	"bicgstab"	Type of linear solver "bicgstab", "multigrid"
regularization_init	false	true, false
regularization_iter	false	true, false
regularization_time	false	true, false
[Physics]		
do_linear_waves	true	true, false
do_continuity	true	true, false
do_q_equation	true	true, false
do_r_equation	true	true, false
do_convection	false	true, false
do_bed_shear_stress	false	true, false
do_viscosity	false	true, false
chezy_coefficient	25.0	Bed friction coefficient
viscosity	0.01	Diffusivity coefficient
[Output]		
dt_his	dt	Time interval to write the history file, [s]
dt_map	60.0	Time interval to write the history file, [s]
[Time]		
start	0.0	Start time of the simulation, [s]
stop	60.0	Stop time of the simulation, [s]

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Keyword	Default	Description
[[ObservationPoint]]		
x	-	x -coordinate of the observation point
y	-	y -coordinate of the observation point
name	-	Name of observation point between double quotes

3 Example input file

```
logging = "None" # "iterations", "matrix", "pattern"

[Boundary] # north, east, south, west
bc_type = ["borsboom", "borsboom", "borsboom", "borsboom"] # Type "neumann", "dirichlet"
bc_vars = ["zeta", "zeta", "zeta", "zeta"]
bc_absorbing = [true, true, true, true]
bc_vals = [0.0, 0.0, 0.0, 0.0]
treg = 150.0 # Regularization time boundary signal
eps_bc_corr = 0.01

[Domain]
mesh_file = "geometry/62x62_6x6km_net.nc"
bed_level_file = "geometry/62x62_6x6km_flat.dep"

[Initial]
ini_vars = ["zeta", "zeta_gauss_hump"]
Gauss_amp = 1.0
Gauss_mu = 0.0
Gauss_mu_x = 0.0
Gauss_mu_y = 0.0
Gauss_sigma = 350.0
Gauss_sigma_x = 350.0
Gauss_sigma_y = 350.0

[Numerics]
dt = 5.0 # Time step size [s], if dt == 0: then stationary problem
theta = 0.501 # Implicitness factor (0.5 <= theta <= 1.0)
c_psi = 4.0
iter_max = 25 # Maximum number of nonlinear iterations
eps_newton = 1e-12
eps_bicgstab = 1e-06
eps_abs_function = 0.01
linear_solver = "bicgstab" # "bicgstab", "multigrid"
regularization_init = false
regularization_iter = false
regularization_time = false

[Physics]
do_linear_waves = true
do_continuity = true
do_q_equation = true
do_r_equation = true
do_convection = false
do_bed_shear_stress = false
do_viscosity = false
chezy_coefficient = 25.0
viscosity = 100.0

[Output]
dt_his = 0.01
dt_map = 30.0

[Time]
tstart = 0.0
tstop = 1800.0
```

