

## Creating an inversion scenario file

Here is content of a typical inversion scenario file. For any waveguide/track parameter one can simply specify its value if it is known. An example:

R 7000

This line sets source-receiver range to R=7000 m. Alternatively, if the value is not known exactly, we can include it into inversion procedure. To do that, one must specify the range and the step for the variation of this parameter. An example:

R 6800:5:7200

This line means that the value of R will be varied from 6800 m to 7200 m with the step 5 m. The following quantities can be specified in the scenario.

Notation	Description	Units	Can be varied?
h	Depth of the water column	m	yes
H	Total depth (including bottom), must be specified for computing modal group velocities/wavenumbers numerically	m	no
function_type	Type of the residual function	uniform, unifrom2, Wan_uniform, Wan_weighted, weighted, weighted2	no
launch_type	Type of the optimization algorithm	bruteforce, ils	no
ils_iterations	Number of iterations in iterated local search (applicable only if launch_type is ils)	integer (10 by default)	no
R	source-receiver range	m	yes
cb	bottom sound speed	m/s	yes
rhob	bottom density	g/cm <sup>3</sup>	yes
tau	mistiming correction	s	yes
d[i] (d1,d2,d3,...)	depths of the sound speed profile nodes	m	yes
cw[i] (cw0,cw1,cw2...)	values of the sound speed at the node points	m/s	yes

Note that sound speed profile is determined by n values of depth

$0 < d_1 < d_2 < \dots < d_n < h$  and  $n+1$  values of the sound speed  $cw_0, cw_1, cw_2, \dots, cw[n]$ . The value  $cw[i]$  is the sound speed at the depth  $d[i]$ , and  $cw_0$  is the sound speed at  $z=0$ . The sound speed is a linear function on each interval  $[d[i], d[i+1]]$ , and it is constant on the last interval  $[d[n], h]$ .

Note that an average PC can easily perform inversion of 2 parameters, while 3 and more parameters can take considerable time, and we suggest to run brute-force (exhaustive search) inversion for 4 or more parameters only using BOINC/cluster.

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% lines beginning with “%” are comments

% first we specify names of dispersion data file (dtimes\_file)

% and magnitudes file (spmag\_file), the latter can be “no”

dtimes\_file 260\_dtimes.txt

spmag\_file(string|no) no

h 50

H 300

% variable parameters

R 7000

rhob 1.7

cb 1700

tau 0

d1 2:1:40

d2 2:1:40

d3 2:1:40

cw0 1450:1:1510

cw1 1450:1:1510

cw2 1450:1:1510

cw3 1450:1:1510

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