New tomawac features for v6p3 links from New version features

 v6p3 Tomawac
 The main new features of this version 6.3 are:

Parallelism re-designed Memory requirements reduced about 30%

 Parallelism:

All cases now work in parallel. Without currents there should be no difference (i.e. all digits equal) between scalar and parallel runs. With currents there are only truncation errors differences due to the computation of gradients in finite elements.

The PUNCTUAL RESULTS FILE (FICHIER DES RESULTATS PONCTUELS) can be written in parallel. Restarts work in parallel, the file used for restarts: GLOBAL RESULT FILE (FICHIER DES RESULTATS GLOBAUX), has now the Selafin format and split in case of parallelism.

The following files:

BINARY CURRENTS FILE (FICHIER DES COURANTS BINAIRE)

BINARY WINDS FILE (FICHIER DES VENTS BINAIRE)

BINARY TIDAL WATER LEVEL FILE (FICHIER DU NIVEAU DE LA MAREE FORMATE)

must have a Selafin format with the same mesh than the geometry file.

In parallelism they will be split into sub-domains. Consequently the keywords:

CURRENTS FILE FORMAT (FORMAT DU FICHIER DES COURANTS)

WINDS FILE FORMAT (FORMAT DU FICHIER DES VENTS)

TIDAL WATER LEVEL FILE FORMAT (FORMAT DU FICHIER DU NIVEAU DE LA MAREE)

Can only have the values 3 (Selafin format) or 4 (user subroutine maruti.f, venuti.f or coouuti.f). Note that the Selafin format was option 2 for the TIDAL WATER LEVEL FILE in the previous versions, you may have to change it to 3.

 New or modified key-words:

"VALIDATION FILE" has been changed into "REFERENCE FILE" (as other codes).

"NAMES OF VARIABLES" (NOMS DES VARIABLES)

It is a single keyword, with five names separated by semi-colons

The velocities, wind velocities and depth may have to be given in files with selafin format. The names of these variables are given in 32 characters, with name in 16 and unit in 16. The default value is:

'VITESSE U M/S ';

'VITESSE V M/S ';

'VENT X M/S ';

'VENT Y M/S ';

'HAUTEUR D''EAU M/S '

French is intentional and the subroutines reading files will try this value and a hardcoded English one which is:

'VELOCITY U M/S ';

'VELOCITY V M/S ';

'WIND ALONG X M/S ';

'WIND ALONG X M/S ';

'WATER DEPTH M/S '

If your file has other names than the standard French and English version, you have to give them in the keyword NAMES OF VARIABLES.

"TIME UNIT IN CURRENTS FILE" (UNITE DE TEMPS DU FICHIER DES COURANTS)

Default value : 1.

If the time is given in hours in the file, the value must be 3600.

It will be the same principle with:

"TIME UNIT IN WINDS FILE" (UNITE DE TEMPS DU FICHIER DES VENTS)

And :

"TIME UNIT IN TIDAL WATER LEVEL FILE" (UNITE DE TEMPS DU FICHIER DU NIVEAU DE LA MAREE)

"TIME SHIFT IN CURRENTS FILE" (DEPHASAGE DU FICHIER DES COURANTS)

Default : 0.

This time will be withdrawn from the time read in the file.

It will be the same principle with:

"TIME SHIFT IN WINDS FILE" (DEPHASAGE DU FICHIER DES VENTS)

And :

"TIME UNIT IN TIDAL WATER LEVEL FILE" (DEPHASAGE DU FICHIER DU NIVEAU DE LA MAREE)

"OPTION FOR DIAGNOSTIC TAIL" (OPTION POUR LA QUEUE DIAGNOSTIQUE)

This keyword allows choosing the option to treat the spectrum diagnostic tail. If option 0 is chosen, no diagnostic tail is imposed in the discretized frequency domain, which means that the spectrum can freely evolve, depending on the source/sink and transfer terms.

If option 1 is chosen, a decrease in f-TAILF is imposed in the high-frequency part of the spectrum, beyond max(4fPM;2.5fmoy).

"OPTION FOR SECOND DERIVATIVES" (OPTION POUR LES DERIVEES SECONDES)

Default value : 1

This keyword is used when the diffraction effects are asked. The second derivatives in the formulas involved may be computed by the Freemesh method (option 1, accurate but expensive), or more simply with two successive derivatives in finite elements (option 2, fast but with some noise in the results).

"1D SPECTRA RESULTS FILE" (FICHIER DES RESULTATS SPECTRES 1D)

This keyword gives the name of the file into which the frequency punctual spectra E(f) (integrated according to the directions) may be written (Ascii file, Scopgene format). The abscissas and ordinates of the spectrum printout points are the same than for the punctual result file.

By default, there is no 1D spectra results file.

 Modifications in user subroutines or new subroutines:

User subroutines couuti, venuti and maruti may have to be changed, they must now give the interpolated values on the mesh (there is no further projection after), and this mesh is restricted to a sub-domain in parallel mode.

Constants are set once for all in subroutine tomawac_constants. PI is ACOS(-1.D0) and the gravity g is set to 9.81D0. This may induce small differences with previous versions, as gravity was sometimes locally defined as 9.806D0 and PI given with a limited number of digits.

The starting element for computing the characteristic line of a point has been changed (to ensure that it will remain the same in parallel). This can also induce small changes in the results.

 New test-cases:

Two new test-cases were added for the validation of Tomawac: the first one is a fetch-limited test-case and tests the different source and sink terms and the growth of the wave spectrum depending of the length of wind action (fetch); the second one checks the behaviour of TOMAWAC in

presence of refraction, shoaling and eventually diffraction effects over a shoal.

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