7...One-way coupled FNPT-RANS model for wave-structure interaction problems...

FNPT ----> IITM-FNPT2D

RANS ----> IITM-RANS3D

Minimalistic list of inputs to be provided by the user in different files:

(1) SOLITARY\_WAVE\_PADDLE\_DISP.CPP

(a) H ---> soliton wave-height (m)

(b) d ---> water depth (m)

(2) FEMINPUT.dat (IITM-FNPT2D)

(a) line "7" ---> water depth (m)

(b) line "8" ---> domain length (m)

(c) line "12" ---> number of time-steps

(d) line "13" ---> time-step size (s)

(e) line "15" ---> regridding (~80 for steep solitons ; ~30 for focused waves)

(f) line "21" ---> wave-gauge locations (m)

(g) lines "24" ---> starting and ending x-locations for FNPT data extraction, number of vertical and horizontal FNPT layers to be extracted

(3) FNPT\_to\_NS.CPP

(a) d ---> water depth (m)

(b) L ---> length of the NS domain (m)

(c) H ---> height of the NS domain (m)

(d) NX ---> total number of NS cells along x [Note: do not change NX\_NS - it's hard-coded]

(e) NZ ---> total number of NS cells along z [Note: do not change NZ\_NS - it's hard-coded]

(f) NX\_FNPT ---> number of vertical FNPT layers extracted in "Output\_PHIT.dat" (has to be consistent with "FEMINPUT.dat")

(g) NZ\_FNPT ---> number of horizontal FNPT layers extracted in "Output\_PHIT.dat" (has to be consistent with "FEMINPUT.dat")

(h) N ---> number of time-steps executed by FNPT (is always equal to (total lines in "Output\_PHIT.dat")/(NX\_FNPT\*NZ\_FNPT))

(4) VOF\_INIT.c

(a) NX,NY,NZ ---> number of NS cells along the x,y,z directions respectively

(b) a\_cyl,b\_cyl ---> (x,y) coordinates of the center of the cylinder (m)

(c) r ---> radius of the cylinder (m)

(d) L,B,H ---> Length, Width and Height of the NS domain (m)

(5) functions.h

NX,NY,NZ ---> number of NS cells along the x,y,z directions respectively

(6) 3-D\_TWO-PHASE-NSE.CPP

(a) EOPC\_ERROR ---> RMS convergence criterion for pressure-correction equation (recommended range: 1e-06 to 1e-08)

(b) L,B,H ---> Length, Width and Height of the NS domain (m)

(c) water\_depth ---> water depth (m)

(d) init\_time\_step ---> initial time-step size for the NS simulation (s)

(e) dt\_FNPT ---> time-step size for the FNPT simulation (s) [Note: init\_time\_step <= dt\_FNPT]

(f) C\_PERMIT ---> maximum permissible Courant number [Note: do not exceed 0.25]

(g) tme\_WRITE ---> starting time for data-file writing

(h) freq\_WRITE ---> frequency of data-file writing

(i) schbln ---> fraction of the limiter scheme for blended momentum advection