Standing wave induced by free liquid sloshing

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LSDYNA ICFD solver

Dev version SVN 108399

LSTC
Livermore Software
Technology Corp.

Case Description

If the viscous effects are neglected, the linear analytical solution of the interface displacement can be approximated by :

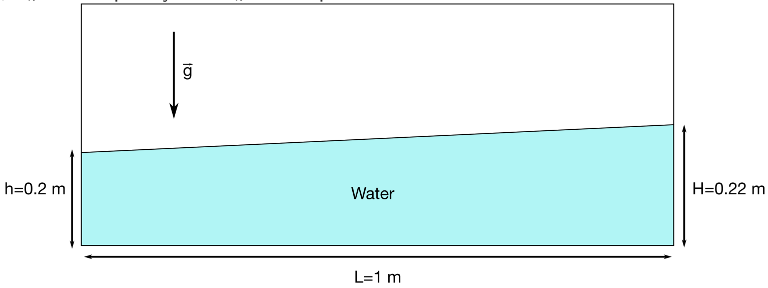
$$\eta(x,t) = \sum_{n=1}^{\infty} A_n sin(k_n.x) cos(\omega_n.t) \tag{1}$$

$$k_n = \frac{n\pi}{L} \tag{2}$$

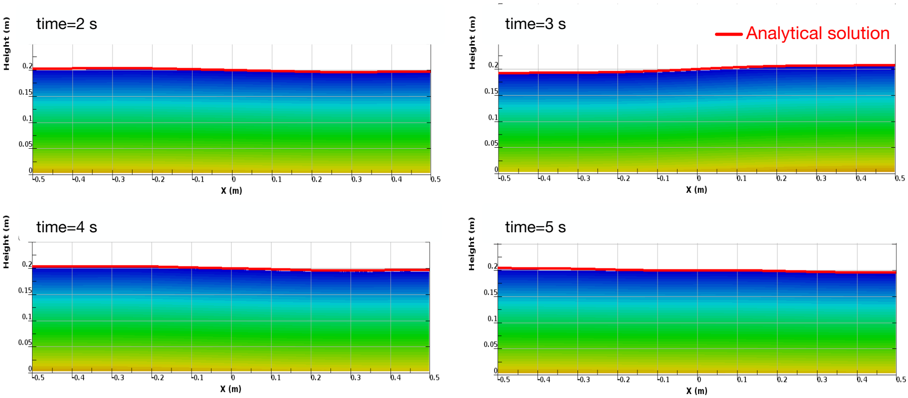
$$w_n = \sqrt{g k_n tanh(k_n h)} \tag{3}$$

$$A_n = \frac{(4SL)}{(n\pi)^2} sin(\frac{n\pi}{2}) \tag{4}$$

With L the length, g the gravity constant, S the initial slope of the fluid interface, k_n the wave number, w_n the frequency and A_n the amplitude.

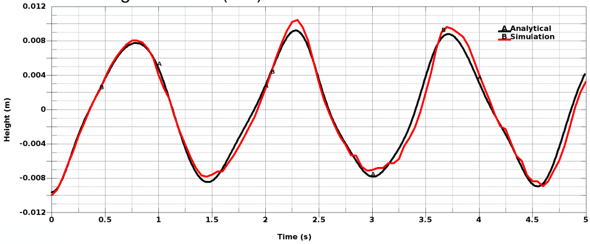


Results- Fringes

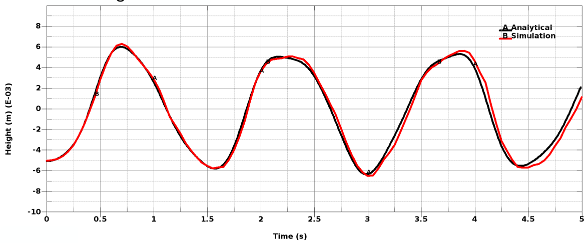


Results- Liquid Height function of time

Fluid Height at -0.5 L (wall)



Fluid Height at -0.25 L



[1] Z. Saoudi, C. Mnasri, Z. Hafsia, and K. Maalei, “Standing wave induced by free liquid sloshing in rectangular tank,” International Renewable Energy Congress, 2010.