

Standing wave induced by free liquid sloshing

Iñaki Çaldichoury

Facundo Del Pin

Rodrigo Paz

LSDYNA ICFD solver

Dev version SVN 108399



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

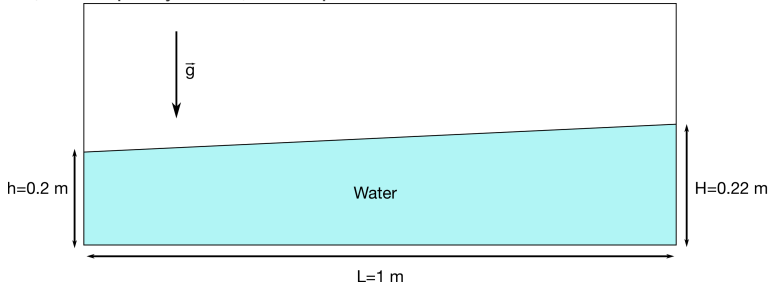
$$\eta(x, t) = \sum_{n=1}^{\infty} A_n \sin(k_n \cdot x) \cos(\omega_n \cdot t) \quad (1)$$

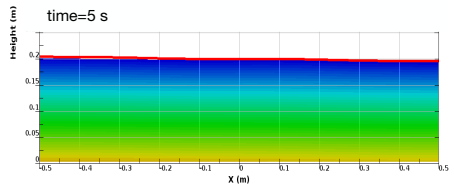
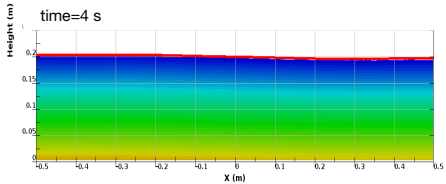
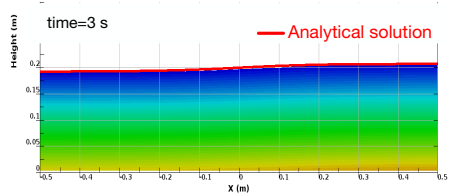
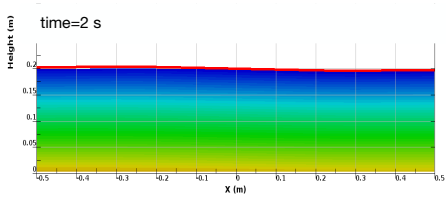
$$k_n = \frac{n\pi}{L} \quad (2)$$

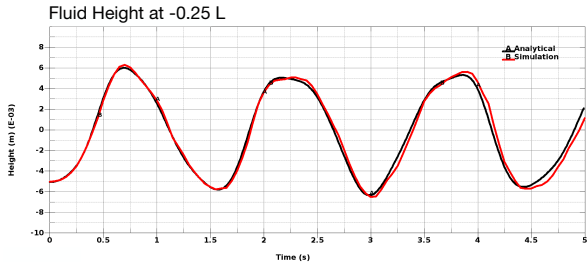
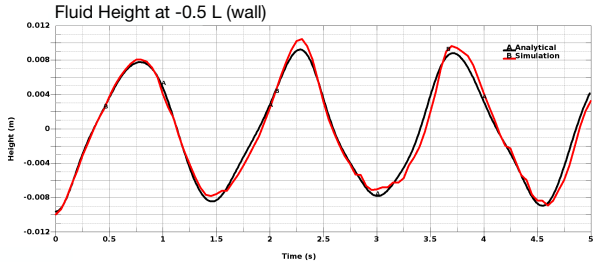
$$\omega_n = \sqrt{g k_n \tanh(k_n h)} \quad (3)$$

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

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







- [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.

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