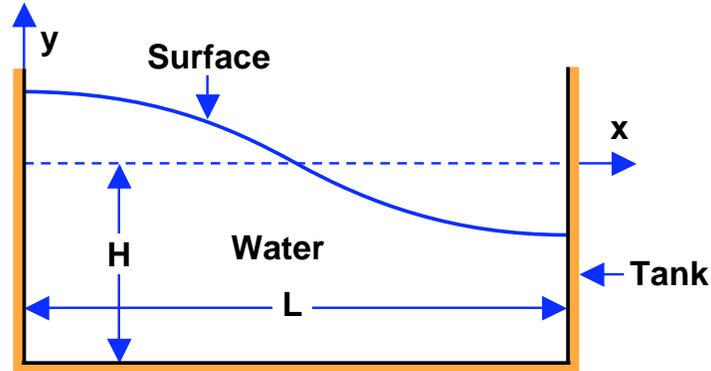


Problem 130F

Water is sloshing back and forth in a box of liquid of mean depth, H , and width, L , so that standing waves are formed.



Assuming that

- the flow is planar, incompressible, inviscid and irrotational potential flow
- the free surface is devoid of surface tension and is at constant atmospheric pressure
- the surface waves are of **small** amplitude and only linear terms in the free surface boundary condition need be included
- the velocity potential of the fluid motion is of the form

$$\phi = (Ae^{ky} - Be^{-ky}) \cos kx \sin \omega t$$

where A , B , k and ω are constants.

find the frequency, f ($f = \omega/2\pi$), of the lowest mode of sloshing motion (the lowest frequency) in the tank in terms of H , L and the acceleration due to gravity, g .