

## Exercise 1:

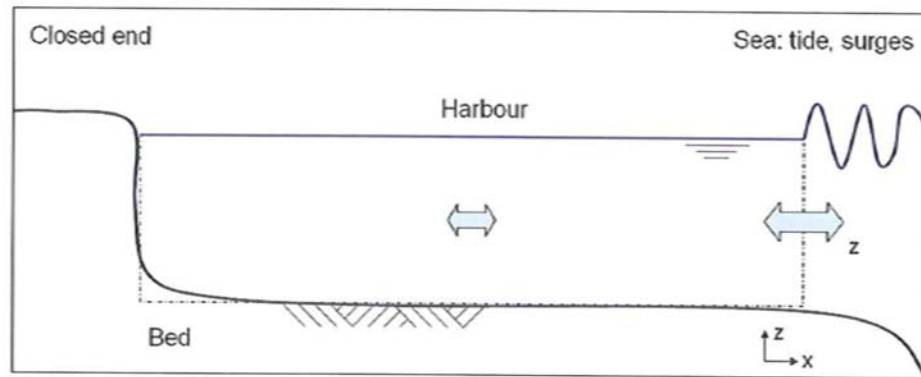


Fig. 1-1: Sketch showing problem to be solved.

## Goal (for CE5377/6077)

- To assess the impact of boundary conditions, initial conditions and physical and numerical parameters by modeling the natural (Eigen) and forced behaviour of a harbour (Fig. 1-1).
- Assess the influence of bottom friction (roughness and depth)
- Try to minimize and maximise the spin-up time by varying the initial conditions (water levels and velocities) and boundary type (water levels and velocities)

## Additional Goal for CE6077 only

- Assess the time step using the Courant wave and Courant advection number
- When (conditions-wise) do the waves behave (roughly) linearly?
- Investigate the difference between standing and propagating waves

## Additional Goals (for personal development)

- Estimate the required simulation time based on the imposed and natural Eigen frequencies
- Calculate Eigen frequencies and spin-up times for various harbour sizes, various combinations of boundary conditions and various forcings both manually and with Delft3D (Fig. 1-2)

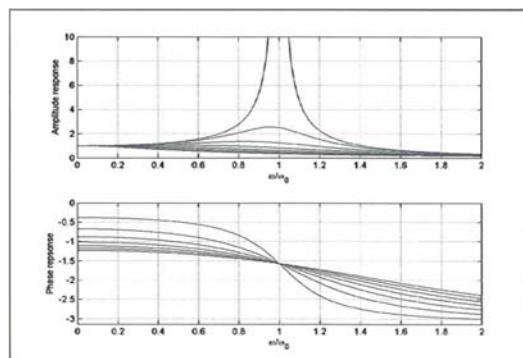


Fig. 1-2: Frequency response curve mass spring system with various friction values.