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On the dynamics of floating structures

The goal of this talk is to derive some equations describing the interaction of a floating solid structure and the surface of a perfect fluid.

This is a double free boundary problem since in addition to the water waves problem (determining the free boundary of the fluid region), one has to find the evolution of the contact line between the solid and the surface of the water.

The so-called floating body problem has been studied so far as a three-dimensional problem. Our first goal is to reduce it to a two-dimensional problem that takes the form of a coupled compressible-incompressible system.

We will also show that the hydrodynamic forces acting on the solid can be partly put under the form of an added mass-inertia matrix, which turns out to be affected by the dispersive terms of the equations.