Floating structures in shallow water: local well-posedness in the axisymmetric case

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The floating structure problem describes the interaction between surface water waves and a floating body, generally a boat or a wave energy converter. As shown by Lannes in [1] the equations for the fluid motion can be reduced to a set of two evolution equations on the surface elevation and the horizontal discharge. The presence of the object is accounted for by a constraint on the discharge under the object; the pressure exerted by the fluid on this object is then the Lagrange multiplier associated with this constraint. Our goal is to prove the well-posedness of this fluid-structure interaction problem in the shallow water approximation under the assumption that the flow is axisymmetric without swirl. We write the fluid equations as a quasilinear hyperbolic mixed initial boundary value problem and the solid equation as a second order ODE coupled to the fluid equations. Finally we prove the local in time well-posedness for this coupled problem, provided some compatibility conditions on the initial data are satisfied.

Références

[1] D. LANNES, *On the dynamics of floating structures*, Ann. PDE, Vol.3, 2017.

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