

Contact in fluid-plate interaction: formation and detachment

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Abstract

In this talk, I will present a very recent result on contact problem for the interaction between an elastic plate and a compressible viscous fluid located between the plate and a rigid bottom $z = 0$. First, by utilizing the vertical fluid dissipation, a new estimate is obtained $\ln \eta(t) \in L^1$ for any $t > 0$ provided that $\ln \eta_0 \in L^1$, ensuring that additional contact can form only on a set of a measure zero. Then, by utilizing the expanding capability of compressible fluid pressure, it is shown that all contact has to detach in finite time provided that the source force is not pushing down too much. Finally, it is shown that contact at any point can be detached in any given time with a strong enough source force localized around that point which is pulling the plate up. This is the first result where detachment of contact is proven.

Keywords: fluid-structure interaction, contact problem, post-contact dynamics, compressible Navier-Stokes.