EXISTENCE OF WEAK SOLUTION FOR A COMPRESSIBLE MULTICOMPONENT FLUID STRUCTURE INTERACTION PROBLEM

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Abstract. I will speak about our recent work on the analysis of a system of PDEs governing the interaction between two compressible mutually noninteracting fluids and a shell of Koiter type encompassing a time dependent 3D domain filled by the fluids. The dynamics of the fluids is modelled by compressible Navier-Stokes equations with a physically realistic pressure depending on densities of both the fluids. The shell constitutes the boundary of the fluid domain and it possesses a non-linear, non-convex Koiter energy (of a quite general form). We are interested in the existence of a weak solution to the system until the time-dependent boundary approaches a self-intersection. We first prove a global existence result (until a degeneracy occurs) when the adiabatic exponents solve $\max\{\gamma, \beta\} > 2$ and $\min\{\gamma, \beta\} > 0$ and further the densities are comparable. Next with a slightly extra regularity assumption on the initial structural displacement we extend our global existence result to the case $\max\{\gamma, \beta\} \geq 2$ and $\min\{\gamma, \beta\} > 0$.
In the first part of the talk I will try to introduce the classical theory on the existence of weak solutions for compressible mono-fluid models. Next I will talk about our work on the multi-component FSI problem.

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