

# On the problem of a compressible multicomponent fluid with or without structure

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The lecture will be devoted to the recent development of the system describing the multicomponent fluids. We begin with the system when the barotropic case with inflow/outflow is considered and we show not only the existence of the weak solution but also as a by-product the generalization of Di-Perna - Lions transport theorem, see [1]. This work was done during last visit of A. Novotný as Distinguished Professor position in Prague, 2 months before his death. After such lost we decided to continue in the study of such problem and we considered the case when the structure is involved (precisely the nonlinear Koiter shell). We proved the weak solutions of the problem, see [2]. In that part the almost compactness is generalized to the case of moving domains. Recently, we solved the problem in the case when the heat conductivity is involved, see [3]. This problem was addressed as an open problem by A. Novotný and his coworkers, see [4].

## References

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- [2] Kalousek, Martin; Mitra, Sourav; Nečasová, Šárka The existence of a weak solution for a compressible multicomponent fluid structure interaction problem. *J. Math. Pures Appl.* (9) 184 (2024), 118–189.
- [3] Kalousek, Martin; Nečasová, Šárka On existence of weak solutions to a Baer-Nunziato type system, arXiv:2406.08383
- [4] Kwon, Young-Sam; Novotný, Antonín; Cheng, C. H. Arthur On weak solutions to a dissipative Baer-Nunziato-type system for a mixture of two compressible heat conducting gases. *Math. Models Methods Appl. Sci.* 30 (2020), no. 8, 1517–1553