

# A maximal regularity approach to compressible mixtures

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## Abstract

I will present recent results obtained in collaboration with Yoshihiro Shibata and Ewelina Zatorska. We investigate the well posedness of a system describing flow of a mixture of compressible constituents. The system is composed of Navier-Stokes equations coupled with equations describing balance of fractional masses. A crucial property is that the system is non-symmetric and only degenerate parabolic.

However, it reveals a structure which allows to transform it to a symmetric parabolic problem using appropriate change of unknowns. In order to treat the transformed problem we write it in Lagrangian coordinates and linearize.

For the related linear problem we show a  $L_p - L_q$  maximal regularity estimate applying the theory of  $R$ -bounded solution operators. This estimate allows to show local existence and uniqueness. Next, assuming additionally boundedness of the domain we extend the maximal regularity estimate and show exponential decay property for the linear problem which allow to show global well-posedness of the original problem for small data.