On planar flows of viscoelastic fluids of the Burgers type

Tomas Los

Charles University

`losjine@seznam.cz`

Miroslav Bulíček

Charles University

`mbul8060@karlin.mff.cuni.cz`

Yong Lu

Nanjing University

`lu@nju.edu.cn`

Josef Málek

Charles University

`malek@karlin.mff.cuni.cz`

Viscoelastic rate-type fluid models involving the stress and its observer-invariant time derivatives of higher order are used to describe a large class of viscoelastic mixtures - geomaterials like asphalt, biomaterials such as vitreous in the eye, synthetic rubbers such as SBR. A standard model that belongs to the category of viscoelastic rate-type fluid models of the second order is the model due to Burgers, which can be viewed as a mixture of two Oldroyd-B models of the first order. This viewpoint allows one to develop the whole hierarchy of generalized models of a Burgers type. We study one such generalization. Carrying on the study by Masmoudi (2011), who briefly proved the weak sequential stability of weak solutions to the Giesekus model, we prove long time and large data existence of weak solutions to a mixture of two Giesekus models in two spatial dimensions.