

3. Modelling of masonry structures by using advanced elasticity

Theories (Prof. Gürlebeck, Dr. Legatiuk)

Masonry structures are probably one of the most typical civil engineering constructions appearing in practice. However, the precise mathematical modelling of such structures is still an open problem. Particularly, the combination of mortar and bricks makes applications of numerical methods quite challenging, since an adequate modelling of the interface between these objects requires high computational costs, which limits practical applicability of such models. In the same time, without the interface modelling it is impossible to predict accurately the behaviour of such a structure. However, instead of performing a sophisticated numerical modelling it is beneficial to look to an advanced elasticity model which covers the presence of the mortar and bricks from the very beginning. Thus, in this project we would like to look for the applications of micropolar elasticity to masonry structures. The micropolar elasticity is the elasticity theory which models not only displacements of a continuum, but its rotations as well. The work in this project will enforce a deeper understanding of modern elasticity theories as well as bounds for their practical applications.