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METHODS AND MODELS FOR FSI IN ENGINEERING PROBLEMS

J. DEGROOTE[1], R. ROSSI[2] AND R. WÜCHNER[3]

[1]Department of Flow, Heat and Combustion Mechanics, Ghent University
Sint-Pietersnieuwstraat 41, 9000 Ghent, Belgium
Joris.Degroote@UGent.be and www.FloHeaCom.UGent.be

[2] Céntre Internacional Métodes Numerics en Engynieria
Carrer Gran Capitá S/N, 08035, Barcelona, Spain
rrossi@cimne.upc.edu and www.cimne.com/kratos

[3] Chair of Structural Analysis, Technical University Munich
Arcisstr. 21, 80333 München
wuechner@tum.de and www.st.bv.tum.de

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ABSTRACT

Innovative construction materials together with modern simulation techniques push the limits of practical realization further than ever. This manifests in the engineering practice in the definition of “structures” which are both, very light and efficient. Examples are large span roofs, parachutes and sails. The reduction in weight makes such structures very sensitive to the interaction with their surrounding and prone to destructive effects as for example flutter or buffeting.
Addressing such issues constitutes a challenge both for “standard” engineering practice and for advanced numerical techniques. From a numerical point of view, this necessitates the development of specially tailored solution strategies to capture properly the essential effects stemming from the multiphysics character of the considered applications. Interestingly the expertise needed is shared between different fields as similar problems manifest, at different scales, for example in the biological sector. The minisymposium aims to provide a forum for discussing the specific problems and corresponding solution methods for lightweight “structures” subjected to flow-induced loadings. The focus will be on “engineering structures”. Nevertheless, it is believed that many of the challenges proposed are common to different areas of research. In the scope of this minisymposium are therefore different numerical approaches to solve surface-coupled fluid-structure interaction problems with light and flexible structures as well as the respective aspects for the considered applications from a practical viewpoint. This means that the variety of computational techniques, like different coupling strategies and methods for interface treatment, should be analysed and evaluated with regard to suitability for the problems described above. Another focus lies in the appropriate consideration of the relevant factors inherent to the simulation of light, thin-walled structures as well as for example highly turbulent air flows, i.e. the correct physical modelling of the coupled system.