6th European Conference on Computational Mechanics (Solids, Structures and Coupled Problems) (ECCM 6)
7th European Conference on Computational Fluid Dynamics (ECFD 7)
June 11- 15, 2018, Glasgow, UK

COMPLEX FLUID FLOWS IN ENGINEERING: MODELING, SIMULATION AND OPTIMIZATION

MAREK BEHR AND STEFANIE ELGETI

Chair for Computational Analysis of Technical Systems (CATS)
RWTH Aachen University
52056 Aachen, Germany
{behr,elgeti}@cats.rwth-aachen.de www.cats.rwth-aachen.de

Key words: Non-Newtonian Fluids, Moving Boundaries, Shape Optimization.

ABSTRACT

The design process in engineering applications is currently experiencing a change in paradigm away from experience-based design to numerical design. In many such engineering applications, flows of complex fluids are encountered; posing the challenge of understanding, describing, computing, and controlling these flows. In this spirit, this minisymposium aims at providing a forum for questions concerning both numerical and optimization methods specific to fluid flow. On the modelling-side it covers the issues related to complex, non-Newtonian flow phenomena, such as choice of model or appropriate stabilization. Furthermore, in the area of simulation, novel numerical methods, ranging from discretization methods to both free-boundary problems and deforming domain problems, are considered. In all cases, the flow solution may serve as the forward solution of a shape optimization problem, requiring a shape representation and a design objective along with problem-specific optimization schemes.

Topics of this minisymposium include, but are not limited to:

- Methods particular to specific applications such as primary manufacturing processes, dam breaks, industrial storage tanks, combustion engines, ship design, etc.
- Non-Newtonian fluid models describing shear-thinning or viscoelastic properties, e.g., Carreau-Yasuda, extended Pom-Pom, Phan-Thien-Tanner, Giesekus, etc.
- Simulation methods including stabilization schemes, interface capturing, and interface tracking.
- Methods and applications related to shape optimization in fluid flow, e.g., geometry representation, boundary conditions on the shape, or choice of objective function.