

SHARING ADVANCES IN MODELLING TECHNIQUES FOR FLUID-STRUCTURE INTERACTION

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ABSTRACT

The proposed Invited Session aims at gathering and sharing latest research in terms of advanced modelling for fluid-structure coupling. It is based on the observation that depending on the applicative communities, a large variety of methods is implemented, from very refined approaches relying on the explicit representation of fluid-structure interfaces through Arbitrary Euler-Lagrange representation, to approaches emphasizing on robustness such as immersed boundaries or porous media, with the need then to assess their accuracy. Bringing together the knowledge acquired for all these techniques used in conjunction with different set of equations, Navier-Stokes equations for incompressible turbulent flows or Euler equations for transient compressible flows for example, thus appears as profitable, assuming that the physics of interest are very different and therefore, the methodological exchanges between the involved researchers can be enhanced.

Showing results in the state-of-the art management of some key issues of general interest whatever the community is encouraged. For instance, but not limited to:

- management of non-linearity in the structural modelling including immersed contact,
- assessment of the relevant level of coupling between fluid and structure, from explicit to semi-implicit or implicit, which can extend to the study of monolithic coupling versus partitioned coupling,
- handling of multiple scales in fluid-structure coupling, including the usage of adaptive mesh refinement.

Review contributions of recent and significant research in the field of modelling for fluid-structure interaction, are welcome in the Invited Session among other contributions focused on specific new advances.

REFERENCES (Not mandatory, maximum 2 references)

- [1] Faucher V., Ricciardi G., Boccaccio R., Cruz K., Lohez T., Clément A. S., *Numerical implementation and validation of a porous approach for fluid-structure interaction applied to pressurized water reactors fuel assemblies under axial water flow and dynamic excitation*, Int. J. for Num. Methods in Engrg., 122(10), 2417-2445, 2021.
- [2] Faucher V., Casadei F., Valsamos G., Larcher M., *High resolution adaptive framework for fast transient fluid-structure interaction with interfaces and structural failure—Application to failing tanks under impact*, Int. J. of Impact Engrg., 127, 62-85, 2019.