

RECENT ADVANCES IN PARTICLE-BASED FSI SOLVERS

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ABSTRACT

This session will focus on *recent advances* and *future perspectives* corresponding to FSI (Fluid-Structure Interaction) solvers in the context of particle methods. Particularly, the main focus will be on partitioned hydroelastic FSI solvers developed within the context of SPH. The solvers may correspond to either entirely SPH-based FSI solvers [1] where discretisations of both fluid and structure subdomains are made by SPH-based models, or partially SPH-based FSI solvers such as SPH-FEM [2], SPH-RKPM or SPH-PD (Peridynamics).

This session will portray the state-of-the-art of particle-based FSI solvers with respect to three important aspects of *reliability* (e.g., accuracy, conservation, convergence, variational and thermodynamical consistency), *generality* (e.g., material and geometrical nonlinearity, extensions with respect to inelastic structural responses, material anisotropy) and *adaptivity* (e.g., adaptive refinement of spatial resolution). The session is also expected to shed light on continued efforts and developments associated with *practical engineering and industrial applications* of developed particle-based FSI solvers.

REFERENCES

- [1] Khayyer A., Shimizu Y., Gotoh H. and Nagashima K., *A coupled incompressible SPH-Hamiltonian SPH solver for hydroelastic FSI corresponding to composite structures*, Applied Mathematical Modelling, Vol. 94, 242-271, 2021.
- [2] Chen C., Shi W.K., Shen Y.M., Chen J.Q. and Zhang A.M., *A multi-resolution SPH-FEM method for fluid-structure interactions*, Computer Methods in Applied Mechanics and Engineering, Vol. 401, 115659, 2022.