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MULTI-PHYSICS AND MULTI-SCALE SIMULATIONS WITH THE COUPLING LIBRARY PRECICE

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ABSTRACT

preCICE is an open-source coupling library for partitioned multi-physics and multi-scale simulations. It enables the efficient, robust, and parallel coupling of separate single-physics solvers. This includes, but is not restricted to fluid-structure interaction. preCICE treats these solvers as black-boxes and, thus, only minimally-invasive changes are necessary to prepare a solver for coupling. Ready-to-use adapters for well-known open-source solvers, including OpenFOAM, SU2, CalculiX, FEniCS, and deal.II, are available. The software offers methods for equation coupling, fully parallel communication, data mapping, and time interpolation. This minisymposium brings together users and developers of the software. It enables the exchange of users among themselves, which otherwise would not know much of each other. Furthermore, the developer team can get direct feedback from users, who they sometimes only know from forum conversations. Lastly, the software and its capabilities can be presented to others in a full and broad sense as not only the developers talk about their software, but also users report on experiences. Recent work focuses on extending preCICE towards two-scale macro-micro coupling, volume coupling including large-scale data mapping, dynamics meshes, and other applications than fluid-structure interaction. For more information, please visit https://precice.org.

REFERENCES

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