

An introduction to the preCICE coupling library

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preCICE [1] is an open-source coupling library for partitioned multi-physics simulations. It enables the efficient, robust, and parallel coupling of single-physics solvers into a complete multi-physics simulation. Use-cases include fluid-structure interaction, fluid-fluid coupling and many more. Only minimally invasive changes are necessary to prepare open-source, commercial as well as in-house solvers for coupling. Furthermore, preCICE provides ready-to-use adapters for well known solvers, including OpenFOAM, SU2, CalculiX, FEniCS, deal.II, with many more in active development. The library offers configurable methods for equation coupling, fully parallel communication back-ends, and various data mapping schemes. preCICE is designed to be a highly flexible and scalable tool, which allows to rapidly prototype complex multi-physics scenarios.

This talk gives a brief introduction to preCICE and explains the capabilities of preCICE as a flexible and reliable coupling library. A code example shows the required modifications to couple a solver using preCICE. New features introduced in the latest preCICE releases¹ are highlighted. Lastly, a brief overview of the minisymposium program is given.

REFERENCES

- [1] Hans-Joachim Bungartz, Florian Lindner, Bernhard Gatzhammer, Miriam Mehl, Klaudius Scheufele, Alexander Shukaev, and Benjamin Uekermann. preCICE – a fully parallel library for multi-physics surface coupling. *Computers and Fluids*, 141:250–258, 2016. Advances in Fluid-Structure Interaction.

¹<https://github.com/precice/precice/releases>