RECENT ADVANCES IN NUMERICAL METHODS FOR MIXED-DIMENSIONAL PDES

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MINISYMPOSIUM

Mixed-dimensional PDE systems arise when coupling unknown fields defined over domains of different topological dimension. They characterize a broad range of relevant problems in many scientific and engineering fields, such as fluid flows in fractured porous media, the design of very large floating sea structures, coupled cortex-cytoplasm dynamics in living cells. They can also be used to impose non-standard interface conditions on a lower-dimensional embedded subspace, e.g., through a Lagrange multiplier.

The aim of this minisymposium is to share and discuss the latest advancements, challenges and perspectives around the numerical approximation of mixed-dimensional PDEs, with a special interest in problems with moving boundaries and interfaces. Topics of interest range from modelling aspects, mathematical analysis, computer implementation and efficiency issues to innovative applications. We will address both parametric and immersed boundary approaches, including (but not limited to) arbitrary Lagrangian-Eulerian, Unfitted Finite Element Methods, Phase-Field or Virtual Element Methods.