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HIGH-ORDER GRIDS: GENERATION, ADAPTION & APPLICATIONS IN FLUIDS AND COUPLED PROBLEMS

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ABSTRACT

Although high-order schemes for Partial Differential Equations (PDEs) are more and more effective and robust to solve complex problems, discretized geometrical domains are still based on piecewise-linear representations for the majority of industrial applications. However, recent results have demonstrated the strong impact of using high-order grids for both accuracy and integration with Computer-Aided Design (CAD). Over the last years, two strategies have emerged to facilitate the generation and use of high-order geometrical representations: on the one side, traditional meshing methods have been extended to non-linear polynomial representations [1]; on the other side, techniques to construct CAD models have been improved to generate computational domains based on Non-Uniform Rational B-Splines [2,3]. Regarding the computational analysis of PDEs, finite-element and discontinuous Galerkin methods have been extended to rational representations with success [4], but industrial applications are still rare [5]. The objective of the proposed mini-symposium is therefore to bring together experts from mesh generation, CAD models and practitioners in Computational Fluid Dynamics, Computational Solid Mechanics and coupled problems such as Fluid-Structure Interaction, to foster collaborations and progress towards the use of high-order grids in industry.

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