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STRUCTURE-PRESERVING AND POLYHEDRAL DISCRETIZATIONS

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ABSTRACT

This purpose of this minisymposium is to bring together researchers who develop and analyze discretizations of partial differential equations which (1) preserve important geometric structure, often in the form of topological constraints, conservation or balance laws, symmetries, positivity structures, or maximum principles, and/or (2) make of polygonal/polyhedral meshes. Examples of such technologies include (but are not limited to) mimetic methods, discrete exterior calculus, Finite Element Exterior Calculus, Virtual Element methods, polygonal finite elements and finite volumes, and compatible discrete operator schemes. Structure-preserving and polyhedral discretizations are characterized by enhanced robustness and accuracy in comparison with classical numerical methods, and their design requires a deep understanding of the underlying structure of the partial differential equation in consideration. Consequently, these technologies give rise to new opportunities in computational mechanics as well as new mathematical challenges. This mini-symposium will be devoted to both new developments in the field as well as applications of the aforementioned technologies.