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ADVANCES AND APPLICATIONS OF POLYTOPAL METHODS

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MINISYMPOSIUM

The spatial discretization within the framework of the traditional finite element method is based on polynomial approximation and simplex elements. This approach simplifies the element formulations but introduces meshing burden on numerical analysis. The last few decades have seen the introduction of a large number of advanced discretization and approximation methods aiming at alleviating the intrinsic difficulties of the finite element methods.

Among the large number of methods in Computational Mechanics, a particular subclass of approaches can be classified as polytopal methods. Two examles are the scaled boundary finite element method (SBFEM) and the virtual element method (VEM). Within the application of solid mechanics, polytopal elements have seen applications in both linear and nonlinear regime in both two- and three-dimensions. The range of applications includes problems of mathematics and engineering and is constantly extended to new fields. Among these problems is elasticity for small and inelastic deformations, like elasto-plasticity, fracture mechanics in two and three dimensions. Extensions of these methods to problems of compressible and incompressible nonlinear elasticity and finite plasticity, are recent as well as applications to contact mechanics, coupled and multi-scale problems.

This mini-symposium aims at gathering researchers in the engineering and mathematics communities active in the VEM and SBFEM and other polytopal methods, and welcomes contributions both from the theoretical, applicative and computational point of view, and is intended as a fruitful moment of interdisciplinary exchange of ideas.