VIRTUAL ELEMENT FORMULATIONS FOR ENGINEERING APPLICATIONS

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FADI ALDAKHEEL [*], EDOARDO ARTIOLI [†] AND PETER WRIGGERS [*]

[*] Leibniz Universitaet Hannover
Appelstr. 11, 30167 Hannover, Germany
aldakheel@ikm.uni-hannover.de; wriggers@ikm.uni-hannover.de

[†] University of Rome Tor Vergata
via del Politecnico 1, 00133, Rome, ITALY
artioli@ing.uniroma2.it.it

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ABSTRACT

Computational Mechanics has many applications in science and engineering. Its range of application has been enlarged widely in the last decades. Still new developments are necessary in order to treat specific problems in an efficient and robust way. A new discretization scheme, the virtual element method (VEM) has been introduced in the last five years. This new method is the focus in this mini-symposium. The virtual element method is a competitive discretization scheme for meshes with highly irregular shaped elements and arbitrary number of nodes. VEM can use convex and non-convex polygons/polyhedra to mesh both two and three-dimensional solids. Despite being only 5 years under development the application range in engineering of VEM has been enlarged such that it includes large strain formulations for hyperelastic and elasto-plastic responses as well as contact and fracture mechanics.

This mini-symposium provides a forum for the discussion and exchange of ideas related to new developments and applications of the virtual element method in engineering. Special focus lies on the numerical treatment and model development in coupled applications like thermo-mechanics and phase field methods but also in the use of VEM in multi-scale approaches, contact mechanics and higher order methods.