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Stabilization free Virtual Element Methods

Stefano Berrone[1], Andrea Borio[2] and Francesca Marcon[3,*]

[1] Politecnico di Torino, Corso Duca degli Abruzzi 24, 10129, Torino,
stefano.berrone@polito.it
[2] Politecnico di Torino, Corso Duca degli Abruzzi 24 10129 Torino,
andrea.borio@polito.it
[3] Politecnico di Torino, Corso Duca degli Abruzzi 24 10129 Torino,
francesca.marcon@polito.it

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The aim of this talk is to present recent developments in the study of Virtual Element Methods in the framework of elliptic problems. In particular, we present a family of methods that have the interesting property of allowing the definition of coercive bilinear forms that do not contain a non-polynomial stabilization term not strictly induced by the operator. We have introduced the first order of the method, named Enlarged Enhancement Virtual Element Method (E^2VEM), in [1]. The key property is the definition of higher order polynomial projections that are involved in the definition of bilinear forms, maintaining the same set of degrees of freedom of the discrete space, with respect to the standard one [2]. We present the general formulation of E^2VEM, providing a proof of well-posedness and a priori error estimates. Finally, we show some numerical results on polygonal meshes.

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