STABILIZATION-FREE VIRTUAL ELEMENT METHODS IN PRIMAL FORM

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Abstract. In the framework of polygonal and polyhedral methods for the solution of partial differential equations, Virtual Element Methods (VEM) play a central role, since they enlarge the class of shapes that can be used in the computational mesh and thus increase the flexibility in handling geometrically complex domains. VEM schemes are based on the definition of local spaces of functions whose analytical expression is not known and suitable polynomial projections of basis functions are used to build consistent discrete bilinear forms, while coercivity is attained introducing a stabilizing operator.

In this talk we introduce a new flavour of VEM in primal form, designed to avoid the use of an arbitrary stabilization term by making use of projections of basis functions on higher order polynomial spaces. These methods preserve the structure of the exact bilinear form and are thus particularly suitable for the solution of problems characterized by anisotropies. We show the theoretical results about the well-posedness of the numerical scheme and display some numerical results highlighting the main features of the method.

Keywords: Virtual Element Methods, polygonal meshes, stabilization

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