VIRTUAL ELEMENT METHODS FOR EIGENVALUE PROBLEMS

F. GARDINI AND G. VACCA

Abstract. The Virtual Element Method (VEM) is a new approximation technique recently introduced in [1] which has been applied to several problems, such as linear elasticity, plate bending, mixed and parabolic problems, just to name a few (see [3, 4, 5, 6] and the references therein). In its abstract formulation the method is a generalization of the finite element method which allows, nevertheless, the use of general polygonal and polyhedral meshes without having to integrate complex non-polynomial functions on the elements.

In this talk we present the Virtual Element Method applied to elliptic eigenvalue problems. As a model problem we consider the Laplace eigenvalue problem. The discretization of the problem requires the introduction of two discrete bilinear forms, one being the approximated grad-grad form and the other being a discrete version of the L^2 inner product. The latter one is built using the techniques of [2]. It is shown that the Virtual Element Method provides optimal convergence rates both for the eigenfunctions and the eigenvalues.

Keywords: Eigenvalues approximation, virtual element method, polygonal meshes

Mathematics Subject Classifications (2010): 65N30, 65N25, 65N12, 65N15

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Dipartimento di Matematica "F. Casorati", University of Pavia, Italy
E-mail address: francesca.gardini@unipv.it

Dipartimento di Matematica, University of Bari, Italy
E-mail address: giuseppe.vacca@uniba.it