Avviso di Seminario

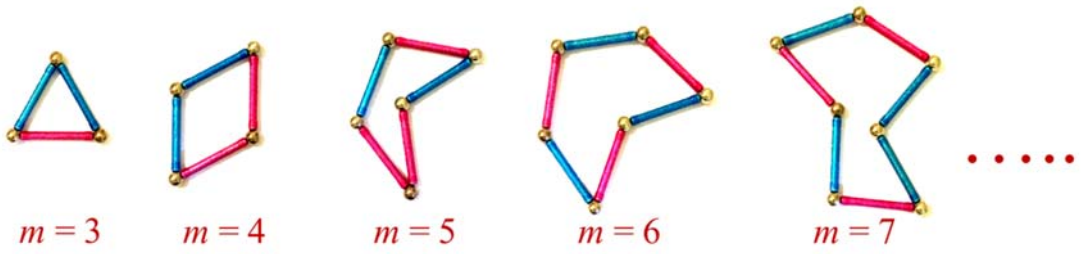
Elio Sacco
Professore Ordinario di Scienza delle Costruzioni
Dipartimento di Strutture per l'Ingegneria e l'Architettura
Università di Napoli "Federico II"

Title

Virtual Element Method for (2D) structural mechanics

Abstract

The virtual element method (VEM) was recently introduced as a generalization of the finite element method with the additional capability of dealing with very general polygonal/polyhedral elements. It has been proved that VEM presents several advantages with respect to classical FEM, such as ability to accurately deal with complex geometries, flexibility in mesh generation, no need of a parent element, easy polynomial degree elevation, very good performances for distorted meshes. For these reasons, VEM has been successfully implemented in a series of applications involving material and geometrical nonlinearity, unilateral contact and in micro-mechanical and homogenization problems.
The standard VEM construction is derived for 2D linear and nonlinear structural problems. Then, an enhanced VEM formulation is illustrated for plane elasticity. It is based on the improvement of the strain representation within the element, without altering the degree of the displacement interpolating functions on the element boundary. The idea is to fully exploit polygonal elements with a high number of sides, a peculiar VEM feature, characterized by many displacement degrees of freedom on the element boundary, even if a low interpolation order is assumed over each side. The proposed approach is framed within a generalization of the classic VEM formulation, obtained by introducing an energy norm in the projection operator definition. Numerical results successfully show the capability of the standard and enhanced VEM formulations.



Dipartimento di Ingegneria, Aula Seminari,
via Vito Volterra 62
Giovedì 21 Ottobre 2021, ore 11:00

Info: Sonia Marfia, , e-mail: sonia.marfia@uniroma3.it, tel. 06 57333447