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Title

Isogeometric analysis: a CAD-FEM integration for interfacial fracture and contact mechanics problems

Abstract

Isogeometric analysis (IGA) has emerged as an innovative alternative to engineering design and analysis methodologies. The key feature of IGA is the exact description of the geometry with a tailorable degree of continuity at the element boundaries. This takes place in addition to the advantageous features of variation diminishing, convex hull properties, and non-negativeness of the basis functions. In such context the continuum is discretized with cubic T-splines and Non-Uniform Rational B-Splines (NURBS) in order to treat contact and debonding problems in a discretized setting. Many numerical examples and convergence studies are shown to demonstrate the potential of IGA to solve challenging interfacial fracture and contact problems in 2D and/or 3D, despite its reduced computational cost compared to the traditional numerical techniques.

Date

24/11/2016, Aula Trasporti, 11a.m.

Biography

Rossana Dimitri is an Assistant Professor at the School of Engineering, Department of Innovation Engineering, University of Salento, Lecce, Italy. She received from the University of Salento, a M. Sc. degree in "Materials Engineering" in 2004, a Ph.D. degree in "Materials and Structural Engineering" in 2009, and a Ph.D. degree in "Industrial and Mechanical Engineering" in 2013. In 2005, she received from the University of Salento the "Best M. Sc. Thesis Price 2003-2004" in memory of Eng. Gabriele De Angelis; in 2013 she was awarded by the Italian Group for Computational Mechanics (GIMC) for the italian selection of the 2013 ECCOMAS PhD Award. Her current interests include Structural Mechanics, Solid Mechanics, Damage and Fracture Mechanics, Contact Mechanics, Isogeometric Analysis, High performances Finite Elements, consulting in applied technologies and technology transfer. During 2010 and 2011 she received a research fellowship by ENEA Research Centre of Brindisi (UTTMATB-COMP) for the development and the characterization of some thermoplastic composites for thermal solar panels and adhesively bonded turbine blades under severe environmental conditions. During 2011 and 2012 she was a visiting scientist with a fellowship at the Institut für Kontinuumsmechanik Gottfried Wilhelm Leibniz Universität Hannover to study interfacial problems with isogeometric approaches. From 2013 to 2016 she was a researcher at the University of Salento, within the ERC starting research grant "INTERFACES" on "Computational mechanical modelling of structural interfaces based on isogeometric approaches". From few months, she is collaborating with the University of Bologna and the Texas A&M University for a comparative assessment of some advanced numerical collocation methods with lower computational cost for fracturing problems and structural modelling of composite plates and shells, made by isotropic, orthotropic and anisotropic materials. She also collaborates as reviewer with different prestigious international journals in the structural mechanics field.