# Isogeometric analysis with local adaptivity for vibration of Reissner-Mindlin plate

Peng Yu[a], Cosmin Anitescu[b], Stéphane Pierre Alain Bordas[c,a,d], Pierre Kerfriden[a,*]

[a] *Institute of Mechanics and Advanced Materials, School of Engineering, Cardiff University*
[b] *Institute of Structural Mechanics, Bauhaus Universität Weimar, Germany*
[c] *Institute of Computational Engineering, University of Luxembourg, Faculty of Sciences Communication and Technology, Luxembourg*
[d] *Intelligent Systems for Medicine Laboratory, University of Western Australia, Perth, Australia*

**Abstract**

We intend to propose a new method using local adaptivity based on a posterior error estimation for vibration modes. This error estimation is computed based upon the hierarchical $h-$refinement to study vibration of Reissner-Mindlin plate. We employ this novel methodology in the framework of Geometry-Independent Field approximaTion (GIFT), which is developed based on Iso-Geometric Analysis (IGA). By using GIFT, the exactness of geometry is preserved with NURBS (Non-Uniform Rational B-Splines), and local refinement in the solution field is achieved by independently employing Polynomial splines over Hierarchical T-meshes (PHT)-splines. With the help of modal assurance criterion (MAC) to identify modal correspondence, local adaptivity is developed for one targeted mode and then extended for multiple modes. The numerical example is conducted by exploiting GIFT and MAC to carry out adaptivity to the quality control of multiple modes, within a targeted range of frequencies. The results show that error estimators of eigenvalue and eigenvector both present the good convergence. Additionally, local adaptive mesh delivers a solution whose accuracy is better than that obtained with a uniform mesh, for a given computational cost.

*Keywords:* isogeometric analysis, PHT splines, error estimation, adaptivity, dynamics

*Corresponding author
*Email address:* pierre.kerfriden@gmail.com (Pierre Kerfriden )