

ISOGEOMETRIC BOUNDARY ELEMENT METHOD BASED ON ADAPTIVE HIERARCHICAL REFINEMENT OF NURBS FOR 3D GEOMETRIES

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ABSTRACT

The considerable potential of isogeometric methods from the promise of cost and run-time saving to more efficient and accurate results, continuity level, convergence and refinement properties attracted numerous computational and numerical researchers in engineering and mathematics to work on different aspects of these methods [1]. The core idea of Isogeometric Analysis (IGA) [2] is to make a shortcut between computer-aided modelling and analysis by describing precise geometries and using them directly in analysis. The direction of this research is to study direct design to analysis by Isogeometric Boundary Element Method (IGABEM) for 3D models by making adaptive refinements [3] to provide reliable solutions even starting from a coarse CAD description. Emphasis will be on the automotive industry. A key aspect of this work is the development of an effective set of algorithms allowing adaptive refinement of Non-Uniform Rational B-Spline (NURBS) surfaces. This work started with IGABEM -NURBS for simple 3D models under simple boundary conditions and the plan is to develop the method for more complex geometries, more boundary conditions, more accurate and fast results by local refinement of NURBS using an adaptive hierarchical scheme.

Keywords: Boundary Element Method, Isogeometric, NURBS, Adaptivity, hierarchical refinement, 3D models.

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