

Extension of Trimmed Surface Analysis to 3D Isogeometric Analysis

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The basic idea of isogeometric analysis (IGA) is to directly use the CAD data in analysis by using the same Non-Uniform Rational B-Splines (NURBS) basis function. However, due to the nature of tensor product form of n -dimensional spline basis, complex geometry especially in 3D should be divided into multiple patches for IGA. Also, trivariate NURBS information is not provided by CAD system. In this study, using the background mesh and trimmed surface information from CAD system, 3D IGA method is proposed. Method to find trimmed element and its intersecting points with trimmed surface is presented. To integrate the various types of trimmed elements exactly, the integration scheme used in 3D NURBS-Enhanced FEM is adopted. 3D models with a hole and trimmed geometry in linear elasticity problem are presented as verification examples.

Keywords: Isogeometric analysis, Trimmed surface analysis, NURBS, NURBS-Enhanced FEM, Trimmed element