

Error estimation and space-time adaptivity for the isogeometric analysis of transient structural dynamics

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Abstract

This paper presents a new adaptive scheme for the error-controlled simulation of transient dynamics problem. We rely on spline bases for the higher-order spatial description of our kinematic fields. Local adaptivity is performed by employing a hierarchical T-mesh technology, in combination with the newly introduced Geometry-Independent Field approximation (GIFT). The Newmark algorithm is chosen to solve the semidiscrete equation of motion. We will present some simple local error estimates to drive the adaptivity, and show how we can ensure that the mechanical energy of conservative systems is preserved during the refinement process.

Keywords: isogeometric analysis, PHT splines, spacetime, error estimation, dynamics

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