

h- and p-adaptivity driven by recovery and residual-based error estimators for PHT-splines applied to time-harmonic acoustics

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© 2019 Elsevier Ltd In this work, we demonstrate the application of PHT-splines for time-harmonic acoustic problems, modeled by the Helmholtz equation. Solutions of the Helmholtz equation have two features: global oscillations associated with the wave number and local gradients caused by geometrical irregularities. We show that after a sufficient number of degrees of freedom is used to approximate global oscillations, adaptive refinement can capture local features of the solution. We compare residual-based and recovery-based error estimators and investigate the performance of p-refinement. The simulations are done in the context of recently introduced Geometry Independent Field approximation (GIFT), where PHT-splines are only used to approximate the solution, while the computational domain is parameterized with NURBS. This approach builds on the natural adaptation ability of PHT-splines and avoids the re-parameterization of the NURBS geometry during the solution refinement process.