CRACK PROPAGATION IN THIN-WALLED STRUCTURES BASED ON GENERALIZED FINITE ELEMENT METHOD

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Abstract. *Finite Element Method (FEM) has been widely used for the numerical modeling of structural problems. Use of computer-based FEM programs was greatly facilitated with the development of pre- and post-processors rich interactive graphics capabilities, allowing users with basic knowledge of geometry to easily work with them. Modeling of discontinuous fields with a standard finite element approximation presents challenges like restrictions on the finite element mesh to align with the discontinuity and the need for remeshing as the discontinuity evolves. The Generalized Finite Element Method (GFEM) was proposed as a numerical method to solve some of these challenges. The GFEM method enriches the standard finite element shape functions locally with enrichment functions which are based on the physics associated with the problem. In this document, our aim is to utilize this method for modeling the nonlinear interface behavior of two surfaces in contact. The final goal of this research is to model crack propagation in thin-walled structures using a two-scale GFEM.*

Keywords*: Generalized Finite Element Method (GFEM), eXtended Finite Element Method (XFEM), Fracture Mechanics, Object-Oriented Programming (OPP), Global-Local Analysis*