

Isogeometric Topology Optimization in Cracked Structures Design

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Abstract : In the present study, the isogeometric topology optimization is proposed for cracked structures through using Solid Isotropic Material with Penalization (SIMP) as a design model. Design density variables defined in the variable space are used to approximate the element analysis density by the bivariate B-spline basis functions. The mathematical formulation of topology optimization problem solving minimum structural compliance is an alternating active-phase algorithm with the Gauss-Seidel version as an optimization model of optimality criteria. Stiffness and adjoint sensitivity formulations linked to strain energy of cracked structure are proposed in terms of design density variables. Numerical examples demonstrate interactions of topology optimization to structures design with cracks.

Keywords : topology optimization, isogeometric, NURBS, design

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