TOPOLOGICAL ASYMPTOTIC ANALYSIS: THEORY AND APPLICATIONS

Abstract. The topological derivative is defined as the first term (correction) of the asymptotic expansion of a given sharp functional with respect to a small parameter that measures the size of singular domain perturbations, such as holes, inclusions, source-terms and cracks (Novotny & Sokolowski, 2013). This relatively new concept has applications in many different fields (Novotny et al. 2019) such as shape and topology optimization, inverse problems, imaging processing, multi-scale material design and mechanical modeling including damage and fracture evolution phenomena. In this talk the topological derivative method is presented, together with a portfolio of applications in the context of topology optimization, inverse problems and fracture mechanics.

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