Computational approach to ductile fracture for anisotropic materials

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ABSTRACT

The objective of this work is the development of a computational approach to ductile fracture for anisotropic materials. The approach is based on the one hand on the imperfection localization theory as proposed by Rice [1] and developed in [2] and on the other hand on general micro-mechanically based porous constitutive equations for the material inside and/or outside the localization band. Specificities of the matrix behaviour (such that lode angle dependency, anisotropy) are included in the original Gurson model through three functions of the stress and the porosity. These three functions are in general not obtained in closed form but can be tabulated numerically allowing for instance to develop the effective yield domain for porous materials with a matrix behaviour obeying Karafillis and Boyce or Barlat models with arbitrary linear transformations. Numerical simulations are presented to show the effects of linear transformations describing different symmetries of the material both on the effective behaviour and their consequences on localization.

REFERENCES

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