Equivalent Formulations of Yield Criteria

Oana Cazacu[1, a)]

[1]*Department of Mechanical& Aerospace Engineering, University of Florida/REEF, 1350 N. Poquito Rd., Shalimar, Fl 32579, USA..*

[a)] cazacu@reef.ufl.edu

Abstract. In this paper are provided mathematical proofs and alternative expressions for widely used isotropic and ortothropic yielding descriptions for polycrystalline metallic materials with face-centered cubic (FCC) crystal structures. In particular, simple and explicit formulations in terms of the components of the Cauchy stress tensor are given for Barlat et al [1] and Karafillis and Boyce [2] yield criteria for such materials. Moreover, it is demonstrated that these two criteria are identical in form, and particular expressions of Cazacu's criterion [3]. Discussion on the advantages of using these new formulations in terms of model parameters identification and finite-element (F.E.) implementation are discussed. Illustrative examples are presented for several aluminum alloys.

REFERENCES

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