SHEAR BANDS, PERTURBATIONS AND BOUNDARY ELEMENTS IN INCREMENTAL NONLINEAR ELASTICITY

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ABSTRACT

The inifinite body Green's function and boundary integral equations proposed by Bigoni and Capuani [1,2], Brun, Bigoni and Capuani [3,4] and Bigoni, Capuani, Bonetti and Colli [5] for incremental nonlinear elasticity are reviewed and illustrated in view of possible extensions. In particular, the possibility is presented of providing an innovative treatment of elastoplasticity and finite strain elasticity via boundary elements, in which domain integrals are completely avoided (Bertoldi, Brun and Bigoni [6]).

The availability of a Green's function for incremental deformations of a prestressed solid is shown to pave the way for a novel treatment of material instabilities, via a perturbative approach. This can be used for the investigation of dynamical instabilities as for instance flutter in a continuum [7] and can be generalized to include perturbations in terms of fractures or rigid inclusions in prestressed continua [8-11].

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