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Research Topic

Title: Nonlocal Microplane Model for Damage in Concrete

Traditional continuum models have limitations to represent the realistic behavior, anisotropic damage occurrence of quasi-brittle such as concrete under various types of loading because identifying the tensor components to represent such behaviour is difficult. The heterogeneous of material under all stress state, stability issues are challenges for FE codes. To overcome these difficulties, the microplane model was developed. The microplane constitutive model can reproduce the macroscopic inelastic behaviour by using simple constitutive relations between stress and strain acting on a generic plane in the material with an arbitrary orientation. Vertex effect, an essential characteristic of concrete which is generally missed by the classical tensorial models, exhibited automatically in the microplane model. The constraint of the microplanes automatically provides all the cross effects such as the shear dilatancy and pressure sensitivity between different orientations. In cyclic loading, fatigue is automatically simulated by the accumulation of residual self equilibrated stresses on the microplanes after each load cycle.

