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*Abstract*

In this paper, we present an enhanced growth method based on virtual displacements and strains fields for generating optimal design in terms of topology and geometry of plane trusses without the need of a generation of so-called ground structure. The method has been applied to the single load case problem with stress and size constraints in plastic design. In order to demonstrate the reliability and accuracy of the proposed method, three examples are carried out: Hemp cantilever, Chan cantilever and McConnel structure.